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FOREWORD

This is a pivotal time in the history of the Ministry of Education and Technical Education (MOETE) in Egypt. We are embarking on the transformation of Egypt's K-12 education system. We started in September 2018 with the rollout of KG1, KG2 and Primary 1. In 2021 we have tolled out Primary 4, and we will continue with the rollout until 2030. We are transforming the way in which students learn to prepare Egypt's youth to succeed in a future world that we cannot entirely imagine.

MOETE is very proud to present this new series of textbooks, with the accompanying digital learning materials that captures its vision of the transformation journey. This is the result of much consultation, much thought and a lot of work. We have drawn on the best expertise and experience from national and international organizations and education professionals to support us in translating our vision into an innovative national curriculum framework and exciting and inspiring print and digital learning materials.

The MOETE extends its deep appreciation to its own "Center for Curriculum and Instructional Materials Development" (CCIMD) and specifically, the CCIMD Director and her amazing team. MOETE is also very grateful to the minister's senior advisors and to our partners including "Discovery Education," "National Geographic Learning" "Nandet Masr," "Longman Egypt," UNICEF, UNESCO, and WB, who collectively, supported the development of Egypt's national curriculum framework I also thank the Egyptian Faculty of Education professors who participated in reviewing the national curriculum framework. Finally, I thank each and every MOETE administrator in all MOETE sectors as well as the MOETE subject counselors who participated in the process.

This transformation of Egypt's education system would not have been possible without the significant support of Egypt's current president. His Excellency President Abdel Fattan el-Sisi. Overhauling the education system is part of the president's vision of 'rebuilding the Egyptian citizen' and it is closely coordinated with the ministries of Higher Education & Scientific Research, Culture, and Youth & Sports Education 2.0 is only a part in a bigger national effort to propel Egypt to the ranks of developed countries and to ensure a great future to all of its citizens.

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Words from the Minister of Education & Technical Education

It is my great pleasure to celebrate this extraordinary moment in the history of Egypt where we continue to launch a new education system designed to prepare a new Egyptian citizen proud of his Egyptian, Arab and African roots — a new citizen who is innovative, a critical thinker, able to understand and accept differences, competent in knowledge and life skills, able to learn for life and able to compete globally

Egypt chose to invest in its new generations through building a transformative and modern education system consistent with international quality benchmarks. The new education system is designed to help our children and grandchildren enjoy a better future and to propel Egypt to the ranks of advanced countries in the near future

The fulfillment of the Egyptian dream of transformation is indeed a joint responsibility among all of us, governmental institutions, parents, civil society, private sector and media. Here, I would like to acknowledge the critical role of our beloved teachers who are the role models for our children and who are the cornerstone of the intended transformation.

I ask everyorie of us to join harids towards this noble goal of transforming Egypt through education in order to restore Egyptian excellence, leadership and great civilization.

My warmest regards to our children who will begin this journey and my deepest respect and gratifude to our great teachers.

Dr. Tarek Galal Shawki

Minister of Education & Technical Education



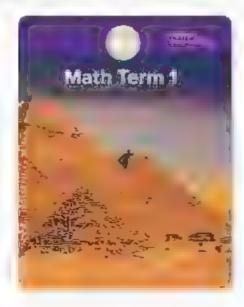


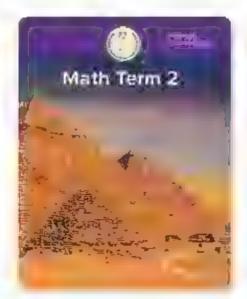
Program Overview

Welcome to Primary 4 Mathematics Techbook!

Mathematics is everywhere around us. Children begin investigating mathematical concepts at a very early age in fact, researchers say bables can visually differentiate between different quantities demonstrating building numeracy as early as 6 months of age. Children get their first math education at home as they count in ake one-to-one correspondence between ordinal numbers and objects, compare quantities, manipulate 2 and 3-dimensional shapes, solve puzzes, look at 1 ones and watches, play with money, and visit markets in their communities. Muthematics helps and dran make sense of the world around them. A children are capable of building deep conception understanding and procedural fluency in mathematics. This program seeks to support students' development as they learn to reason mathematics of, communicate using appropriate mathematical, language, solve complex problems, and work collaboratively with peers. As you read the new Primary 4 student and teacher instructions, resources, neep a few things. It mind

- The Primary 1 through Primary 3 mathematics curriculum, implemented across
 Egypt starting from 2018 to 2020, he ped lay a foundation for young students to
 solve complex mathematical problems, persevere in the face of the length girath
 content, and think and active mathematicans.
- The Primary 4 mathematics content is more that and no than ever before However students are aided by their experience in the new KG through Primary 3 curriculum. To help all students reach the one enging expectations in Prepland Technique, Primary 4 Mathematics Technology offers opportunities for student to build procedura, fluency, make sense of real world problems, mode their thinking and proplem solving strategies, communicate their reasoning, make connections petween prior learning and new concepts, and identify patterns and rules that promote number sense and make computation, mode efficient
- The Primary 4 math curriculum is called a Technook of The Technook is more than test print it is a 21st-century instructional resource designed to inspire and empower at students through digital and print learning. You will the triat the program has content in both print and digital beat ons so that students can learn no matter what access they have to the print book or digital versions.







Program Philosophy

The Primary 4 Mathematics Techbook was designed and written to teach to the Ministry of Education Primary 4 Mathematics standards. These standards are internationally benchmarked, providing students in Egypt with a rigorous framework of learning targets.

The first step in building the Primary 4 standards was the adoption of new standards and specific grade-level indicators for learning and applications in number and operations a gebraic thinking, geometry, data collection and analysis, measurement, and fractions and decimals. These standards are integrated across tripe-dimensions.

- Learning standards and skills
- Application meoritext
- Standards for mathematical practice

This entire approach to teaching mathematics is referred to as three-dimensional learning. The deal of that math is much more than accumulation of facts, rather, it is an intersection of three dimensions: mathematical sky is and concepts, problem so ving, and engaging in practices that support mathematical times in and reasoning



The intersection of these three dimensions provides the foundation for the mathematics content in Primary 4. The structure of Primary 4 Mathematics Techpook also embedies the Ministry's shifts in the Framework for Education 2.0., specifically focusing on the following.

- accessing new and prior knowledge
- "building contextual understanding and procedural fluency and
- making connections across mathematics domains to support application of skills and concepts



Program Overview

Globally Prepared Students: Mathematics in Context

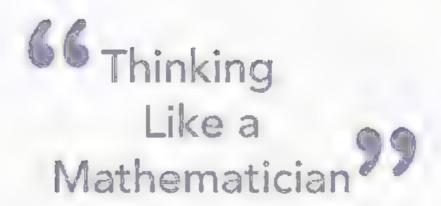
To help students make sense of mathematical nontent and to help students understand the role of mathematics in our lives, Printary 4 Mathematics Technocik integrates at hematic approach to help students understand and apply mathematics in a variety of real-world scananos.



Engaging, Hands-On Learning: All Students as Mathematicians

Hartus-On Activities (10As) are a central component of Primary 4 Mathematics. Techbook Hands-On Activities require students to investigate patterns and rules in mathematics; build mathematical understanding through observation, collaboration, and problems of which mathematical and models

A materials list for each HOA is included in multiple locations: at point-of-use in a gradiant the print Teacher Edition, both at front of concept and at point of use. Mathematics materials have been chosen to be easily access to eland mostly familiar to both students and teachers. Options are given for commercially available manipulatives and paper pased versions of those manipulatives. Each materials if should be reviewed well in advance of the date of plassroom use to ensure a materials are available or prepared.





Reading, Writing, Speaking, and Listening in Mathematics Reading, Writing, and Mathematics

Writing sian important part of mathematics because it is now real mathematic ans oncoment and communicate their deas, activities, and cohous onstolothers. Primary 4 Mathematics Techbook engages students in many kinds of writing particularly in Writing About Mathitasks, which often ask students to explain their reasoning and support their thinking using words, numbers, putures, and symbols

informational texts throughout Tachbook he pietudents strengthen their reading comprehension skills while providing context for learning. Primary 4 Mathematics Terhbook also expects students to use speaking and listening skills to demonstrate their understanding and application of mathematics skills and contepts. Both the digital and the print resources will engage students in the practice of this type of writing, speaking, and listening.

Building Mathematical Language of All Students

Reading and writing success in mathematics depends on the ability of students to understand notionly the definition of vocabliary words, but also now the aredemic anguage connects ideas, adds details, or he ps them accurately express the reasoning, thinking, and reasoning. Academic anguage is supported and emphasized through strategies for earning vocabiliary frequent vocabiliary used in various to itexts, and formative assessment tems.

Student-Centered Learning and the A-B-C Instructional Framework

When the igear moves, they all moves All components of a lesson are dependent on one another and are not entirely, we at Students continue to access knowledge as they build understanding. They make connections as they access knowledge. They build understanding and reasoning as they connect deas. When students engage in non-tasks that access prior knowledge and build reasoning it is easier for them to efficiently and effectively make connections to the real world and to other mathematical rearring.

Program Ovarview





Instructional Model

A-B-C Instructional Framework

Lessons within the A \$-C Instructional framework are structured as follows:

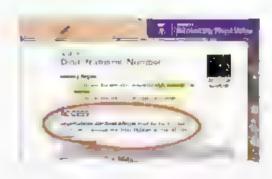


ACCESS (5-10 minutes)

Provides opportunities for:

- Engaging samers, everaging prior knowledge, sparking interest
- Fac teting mathematical conversations to bill diconnections
- Supporting various ways learners make their understandings visible

Focus: Developing and expressing mathematical language





BUILD (35-40 minutes)

Provides opportunities for:

- Developing fluencies with graduated levels of support
- Questioning, responding, and gwing suggestions to support learning
- Reflecting on inistakes and misconceptions to improve understanding

Focus: Communicating about understanding, reasoning, evidence, strategies, and lingering questions

CONNECT (5-7 minutes)

Provides opportunities for:

- Connecting learner-generated strategies to procedures
- Engaging in challenging tasks that a low learners to transfer knowledge to new situations
- Identifying, expressing, and applying critical connections between and among mathematical skills and concepts

Focus: Building ability to communicate deep conceptual understanding and to ask meaningful questions to challenge misconceptions

WRAP-UP (3-5 minutes)

 Students express verbally or an writing what they "connected" and learned.

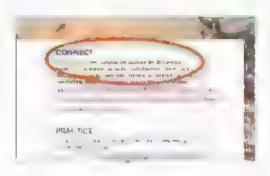
PRACTICE

- He ps teachers make decisions about instructional grouping and differentiation.
- Up to 5 varied practice problems that a low students to demonstrate learning

Flexible use:

- Could be done with whole group, in small groups with or without the teacher, or independently (at the teacher's discretion)
- Could be part of remediation
- Could be an extension of the Wrap-Up discuss on
- Lives, in the Student Edition (print and digital)







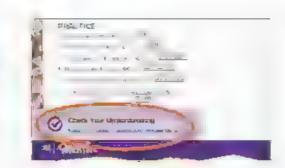
Instructional Model



Instructional Model

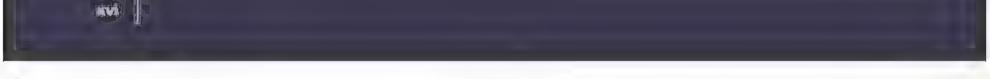
Check Your Understanding

- A lessons in ade a Check rour understanding (Criu) section that consists of 2.5 practice problems. These problems allow teachers to rollect information quickly and effectively about students' leafining.
- The section can be assigned for independent practice during small group institution (while the teacher works with other students) or homework
- The section can include a little spiral review, but that should not be the focus of the CYU.
- These ranche used for a grade
- The Check four Understanding propertis are available in the digital Student Edition, and provided to the teacher for copying and distribution in the Teacher Edition. Answers to these properties appear with nithe Teacher Edition at point of use.



Assessment

Each Concept a oses with a Concept Check in and Remadiation lesson. The Concept Check in is a formative assessment that he psithe teacher make, instructional decisions. The Concept Check in is accompanied by sudgested strategies for addressing students' lingering misconceptions and errors. Concept Check in and Remadiation lessons are available unithe digital Teacher Eq.(10). A Unit Assessment is provided at the end of each unit of instruction. This assessment is summative and can be used for a tirade.





Techbook Overview and Features

Primary Mathematics 4

Course Structure

The Printary 4 Mathematics Techbook is a comprehensive teaching and learning package, featuring an easy-to-use orgital platform, an interactive print Student Edition, and a print Teacher Edition provides guidance for teachers to implement night-quality three-dimensional learning through mands-On Activities exploration of mathematics skills and concepts through mode's practice, and application and print and digital assets. This flex bit yield resources supports the many variations of transformations of transformations so teachers can, implement standards-based lessons no matter than performance stuation. The digital and print resources work seamlessly together, allowing students to both express thinking on paper and explore deas and concepts digitally.



Themes

The Primary 4 Mathematics, techbook is organized into four themes that form the structure of mathematics courses from Primary 4 through Primary 6. In each grade, the theme is studied through an applied topic, represented by units within this curricular resource. The themes and Primary 4 units are as follows.

Thems	Primary 4 United		
Number Sense and Operations	1 - Place Value 2 Addition and Subtraction Strategies 3 Concepts of Measurement 4 - Area and Perimeter		
Mathematical Operations and Algebraic Thinking	5 - Multiplication as a Relationship 6 - Understanding Factors and Multiples 7 - Multiplication and Division: Computation and Relationships 8 - Order of Operations		
Fractions, Dec mais, and Proportional Relationships	9 - Fractions 10 Decimals 11 Data with Fractions		
App. cations of Geometry and Measurement	12 - Geometry 13 - Angles of a Circle/Year-End Review		

Technook Overview and Features

1



Techbook Overview and Features

Concepts

units are divided into concepts. These concepts break down the major learning of each writting on each writting on struction. This conceptua approach helps students make sense of new learning in the context of existing understandings and supports their efforts to make connections across skills and concepts.

Lessons

Each concept is composed of a series of lessons. The unit Structure and Pacing information clearly out lies the sequence and duration of each lesson for schools with daily, 60 minute mathematics instructional periods. Attendative pacing is provided to support learning environments that teach math in 45-minute or 90 minute blocks of time.

abssonsitypically begin with whole droup discussion and instruction and may not de partner or small group; split-classroom or station rotation learning activities.

- Whole Group: Frovides an opportunity to bring students
 together as one whole group to introduce a new concept,
 engage that en discussion-based or inquity based instruction,
 or aduress similar gaps in knowledge and provide
 ristruction to address needs. Whole-class strategies Lain
 include Math Taik, Math Language Routines, discussion,
 teacher demonstrations, and giving directions.
- Partner or Small Group: A rows students to support one another's learning during who eigroup activities
- Split Classroom: A lows teacher to focus on a topic or skull with up to half of the students in class, while the other half works independently or with a colteacher.
- Station Rotation: A laws students to rotate through stations on a fixed schedule. One of the stations is typically teatmented, while others can be independent or working with partmer(s).

Review Lessons

Throughout the instructional materials, there are several lessons marked as Review essons. These lessons are designed to help students recall and apply important skills and concepts they learned in Primary 3 before they move on to more challenging. Primary 4 content. These lessons can be used with a small group or with the whole assist at needed if students do not require a Review lesson before moving on to Primary 4 content. Review lessons can be skipped, and institution can continue with the next lesson.



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Tools and Text Features

The tools within every concept in Primary 4 Mathemat is Terlinool, support differentiation for lessons and cater to the different earning prefetences of diverse earners, white digital note interactive text, students and teachers can have text read aloug, high got important information, or annotate content with sticky notes. Select the text for any concept, and a reader too will appear



Digital Teacher Materials

In ringital Primary 4 Mathematics Techbook, teachers can not only easily see the student view of content, but't ney can also access additional support using the Teacher Presentation Mode toggle. Teacher notes including both the instructional focus and regommended strategy, are the uded with each activity and are wished to teachers only, in addition, teachers can view sample responses and defalled procedural notes.

Flexible Learning Environment

With the evolution of technology, today's students expect information to be available differently than previous generations of students. Students are accessing information in shorter segments, streaming digital shows, and reading posts through social media. The Primary 4 Mathematics Technook taps into students' preferences of consuming digital content and provides inginy engaging, standards-based content guaranteed to hispire and encourage students to denie deeper into mathematics.

The Primary 4 Mathematics Technook features on multimed a resources video, mages, informations text, and more. On he mathematics tooks allow a students towascess and use tooks that mathematicians use to analyze and solve problems, not uding calculators, geometry tooks construction tooks, and whiteboards.

Techhook Overview and Features





Techbook Overview and Features

Interdisciplinary Projects: Content and Real-World Connections

A inique addition to the Primary 4

Mat rematics Techbook of the intendisciplinary Projects are personally for students ence personally for students ence personally formally Projects are based on real-world challenges derived from the united Nations Sustainable Development Goals. Columnas across the globe adopted these Sustainable Development Goals in 2015 (with annual monitoring and tracking) to "end poverty, protect the planet and ensure that all people enjoy peace and prospertly by 2030."



For students to authentically connect to academic content, practice life skills, and deeply understand Egyptian issues, we must provide opportunities for students to do search for their nawn so utions. The interdisc prinary Projects a low students to do just that. Students are presented with a challenge and then given the opportunity to generate ideas using knowledge and skills from science, mathematics, and other disciplines. Students work with classmates to design a solution to build, test, and refine using the Engineering Design Process.

The first interdisciplinary Project, "To Get to the Other Side," challenges students to think about sustainability in a community that neides humans and other living organisms. Students consider the needs of a reptile, the plue Sinal agains, and how these lizards interact with a school community's needs for a new sidewalk.



https://www.indp.org/content/undp/er/home-sustainable-development goals intim





Using the Course Materials

Teacher Edition

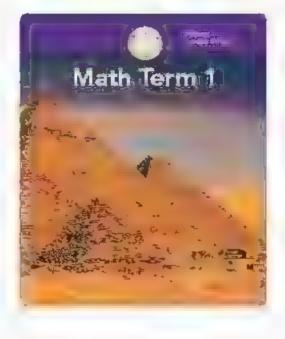
The Primary 4 Mathematics Teacher Edition is designed to support instructors in the preparation and implementation of rich and engaging earning expenences in provides clear step-by-step instructions embedded with teacher input, instructional strategies, and classroom maillagement techniques in these earning expenences, students exporte, play, use manipulatives, communicate and collaborate with pages, ask and seek answers to questions, and practice new skills and concepts

This instructional approach aims to help students accomplish the following goals:

- build numeracy.
- discover connections between and among math concepts
- develop computations fluency
- acquire and use math vocabulary
- build awaraness of measurement and geometry concepts
- enhalise critical thinking, problem solving, collaboration, and communication.
- .ncrease en oyment of math

If instructors have not used such a guide before, some practical advice follows:

- read each whit carefully in advance of instruction. Make notes and right important details.
- didvance preparation will ease the instructor's workload and ensure successful earning experiences for students
- gather the necessary materials and make any preparations before implementing the lessons
- consider additional classroom management techniques necessary for your particular class and learning environment



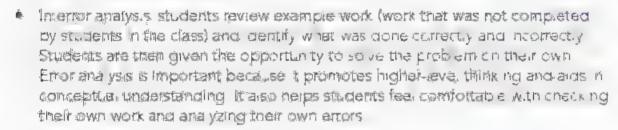
Using the Course Materials

Student Edition

The Primary 4 Mathematics Student Edition contains Learning Targets, ACCESS BUILD and CONNECT sections, and Practice, Index, Student Resource, and Glossary pages

ACCESS

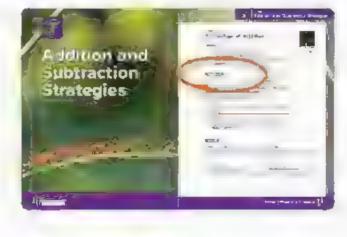
- ACCESS provides a space for students to record their work and thinking as they participate in the ACCESS activity
- Students work independently, in pairs, in small groups, or with the whole class to develop computational fluency and pure deep conceptual understanding
- Students work with the teacher and one another to build connections between prior knowledge and new learning
- Strudents engage in error arraysis to review and reinforce previously rearned skuls and concepts

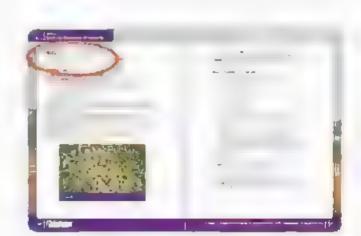


BUILD

TO B

- Bib._D provides an opportunity for students to immediately apply the skills and concepts they are earling in class.
- Students work Independently, in pairs, and in small groups to expicite, discover, and apply new skills and concepts
- Students have multiple opportunities to check their work and the work of others. This kind of error analysis strengthens students' learning and deepens their understanding of mathematical concepts and connections.
- BUILD is an excellent resource for informally assessing student progress.

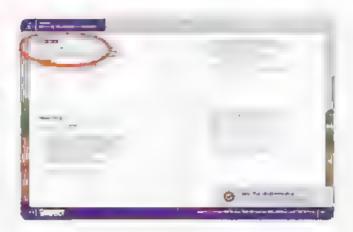






CONNECT

- Students reflect on their learning through drawing writing, and completing related math activities.
- Writing About Math provides opportunities for stude its to make written connect ons between new content and previous learning and setween formal math concepts and the rea, world
- Writing About Math is another great resource for riformally assessing student progress and gathering information about students current understanding and patential misc ancept ons



Resource Pages

These pages appear at the end of the Teacher Edition and Include math fools and resources for students. Students may tear dult these pages and cut, color, or use resources pages as directed by the teacher. Digital versions of these pages may be printed out and photocopied for student use

The information you gather from the ACCESS, BWILD, AND COMNECT sections can be used to plan future instruction and differentiation (see Assessment)

Take note of the following:

- What are students discovering or learning? (Content)
- What are students' misconceptions or misconderstandings? (Remediation)
- What are students baing asked to do? (Artivity).
- What is the teacher discovering about students? (Assessment)
- How could you adapt the lesson for the different ab littles in your class?
 (Differentiation)

Duting and after the implementation of each lesson, reflect and make notes on what was successful as well as possible suggestions for improvement

Planning with another instructor can often lead to greater implementation success as it provides an opportunity to discuss cassroom expectations, management procedures, and strategies for differentiation according to the needs of students. It is suggested that teachers meet with other instructors at least weekly to plan and reflect

Using the Course Meterials 1001

KHI

Formative Assessment

What is formative assessment?

The femiliassessment often orings to mind exams. Exams can be effective at summarizing learning at the end of a chapter unit instructional period, or school year. After a student learns mater a for a certain amount of time, an exam measures now much the student has earned, retained and can apply **Formative assessment** encompasses strategies used in the classroom to find out if and how much students are earning along the way, so that instruction can be adjusted

Why embed formative assessment in instruction?

Formative assessment is a tool that supports responsive teaching. Embedding formative assessment provides instructors with evidence about now much students are earning, retaining, and applying. A teacher who frequently seeks and receives feedback about how much progress students are making toward earning goals can adjust instruction to respond to misconceptions, misunderstandings, and gaps in students' ability to apply learning

How does embedding formative assessment improve learning?

The following table (M. Jam, 2011) provides an overview of five strategies that instructors, peers, and students can use to give and raceive evidence of learning throughout the learning process.

	Where the Learning ls Going	Where the Learner Is Right Now	How to Get There	
Teacher	Carriyang sharang, and understanding what we ntend for students to early and the criteria for success	Exciting evidence of learning	Providing feedback that moves learning forward	
Peers		Activating learners as instructional resources for one another		
Learner		Activating learners as overearning	vners of their own	

William, Oylan Embedded Formative Assessment & comington, Solution Tree Press, 2011



The first essential step is to identify (and share with students) the desired learning targets, or "where the learning is going." Once learning goals are established, teachers, peers, and students themselves can check in on "where the learner is right." now," or how much progress is being made toward the goals. Rather than assessing, whether or not a student has sufficiently learned confent after the fact, formative assessment practices provide feedback so that teaching and earning (individe get there") can be adjusted to better obtain the agreeu-upon goals.

What does embedding formative assessment look like in the classroom?

Formative assessment often occurs through classroom discussions and tasks that ask students to explain and just fy their thinking if individual students struggle to understand or apply a concept, a teacher can differentiate instruction or provide peer support to most that students' needs instructors can also dather information about student earning during instruction. For example, by walking around the classroom and chediting students' work as they practice new learning in Bull. Dit teathers can earn a great dealivery quickly about students' understanding and misconceptions When man, students exhibit exidence of misunderstanding or gaps in knowledge or sk is, a teacher can decide to review, reteach, or present a new approach to achieving the learning goals

Assessment



Thinking Like a Mathematician

Students were introduced to the idea of thinking like a mathematician in Primary 3. As students begin to earn more complex and challenging mathematics, learning and practicing these skills and behaviors will help them become thoughtful, responsible learners. The instructor is advised to create a "Thinking Like-a Mathematician" a nunor chart (as shown be bw) to display throughout the year.

Good Mathematicians				
Persevere	."can make sense of problems and keep by ng			
Represent	can show what the proplem is asking in pictures, numbers, and words			
Explain	Lean-explanamy transing and work and compare my strategy with others			
Model	Lean apply what I know about math undifferent problems			
Use Took	Litan chapse appropriate tools and use them effectively to solve propiers			
Are Accurate	- Work carefully and check this work to make sure it, s arcurate and precise			
Use Structure	can find patients and use what I know to solve new problems			
Notice Patterns	cart use what I house to explain rules and shortcuts when solving problems			

There are references to the "Thinking Like a Mathematical" skills and behaviors throughout the ressorts. However, it is recommended that the instructor refer students to the anchor chart during instruction whenever possible and helpful, whether or not it is noted in the Teacher Edition.

Instructional Strategies

Many of the instructional strategies described below are woven throughout the Primary 4 Mathematics Teather Edition. These are not meant to be the only methods. used in the classroom, rather they are highlighted as best practices for engaging students in active, inquity cased learning. As teachers and students opin familiarity with the strategies, instructors may wish to modify and personalize to suit the needs of each however classroom

Instructional Strategy Name	Brief Description				
Ask 3 Before Me	Students ask three peers for assistance before asking the teacher. This strategy is used when students are working co. aboratively to develop communication as is, encourage peer interactions, and decrease reliance on the teacher's support in arge classrooms.				
Attention- Getting Signal	The teacher uses an expect signal to get the attention of the class when they are taking in parts of working in groups. There are many options for signals and more than one can be used as long as students recognized to Options include a diap pattern that students repeat, a simple call and response phrase, or a hand in the air (see Hands up, This strategy allows teachers to ask for students attention without shoulding or immediately distributing student conversations.				
Brainstorm	Students provide multiple answers for an open ended question. This can be done as a whole dass or in groups or pairs. The purpose of a brainstorm is to list many answers not to critique whether answers are realistic feasible, or correct. Once an in the broad list injude, students can go back to answers to prioritize or a minate some options. This strategy promotes theatwity and problem-activing.				
Calling Sticks	Teacher writes the names of students on popsic elsticks and praces them in a can , at To call randomly on students, the teacher pulls a stick from the jar. After calling on the student, the teacher places that stick into another can/, at so that stident is not immediately called on again. This strategy he psiteachers callion a write variety of students and encourages a students to be feady with an answer.				
Count Off	Teacher breaks students into groups by having students count off to a certain number it is important to teal students to remember their number. For example, if the teacher wants three groups, the first student counts one, the next student says two, the next say times, and the next student starts over at one, and so on When a, students have counted, teal at the number ones to meet together at the number twos, and then all the number times. This strategy enables time-efficient grouping and reinforces conceptual number use.				
Fishbowi	Students gather around a teacher or group of students who are mode, no something new. The students observe carefully as if they are watching fish in a bow! This strategy promotes the full attention of students even when include a students are not actively participating in the demonstration.				

Instructional Strategies and Differentiation





Instructional Strategy Name	Brief Description					
Fist-to-Five	Student self-reflect using a "Fist-to-Five," where "fist" indicates no understanding and "five fingers" indicates a deep understanding of all ferms					
Four Corners	Each of the four comers of the room corresponds to a possible opinion about a thought provoking statement. The teacher may post a picture or a prompt in each corner of the room to represent the opinions/statements. Students walk to the circum that interests them or expresses their op mon to group with other ke-minded students. This strategy allows students to express opin one and to prepare justifications with others who agree perfore presenting to the class					
Gallery Walk	As if n a museum students walk past displays and respond to questions or prompts about the display. This strategy can be used in multiple ways, including to consider cleas posted on chart paper around the room or to view classinates him products. This strategy encourages diversity of thought. When used at the end of a project, this strategy allows students to be epitate and take pride in their work while also honoring and responding to others, work.					
Hands Up	The teacher holds a hand in the arto's gnal that students should stop what they are doing, stop taking, and look up at the teacher. When students notice the teacher's hand up, they also raise a hand to signa to classmates. This strategy is used as an attention-getting signa.					
Hands Up, Pair Up	Students stand and war around the room quiet y with one hand raised in the air. The teacher says. Strip—Pair Up: "Students dap hands and stand together with a nearby student. Anyone with a hand still up needs as a partner. Students can easily find each other and pair up.					
l De, We De, You De	Do Teacher-demonstrates or models an action to take place, such as reading a passage to the students. We fin Student repeat the action with the teacher such as re-reading a passage in uniso." You Do Student practices the samed action without the guidance of the teacher. This strategy supports students by modeling an expectation, allowing for low-pressure practice, then providing opportunities for independent practice.					
Jigsaw	Students are divided into small "home" groups (for example, groups A. B. C. D. and E). The teacher provides different instruction (or instructions materials) to each "nome" group so that each group becomes the "expert. In their unique shill or strategy For example, there is a group of Alexperts, Blexperts. Clexperts, and so on The teacher then carefully regroups students so that each new small group has at least one infember of each "nome" group. For example, each new group will now have one A, one B one C, and so on Student experts teach each other what they have rearned. This strategy he ps students develop paymership of their own learning, confirmitheir uniderstanding, and build confidence in their mathematical abuilties.					

KINDO



Instructional Strategy Name	Brief Description					
Lean and Whisper	Students earl one shoulder in toward one neighbor to answer a question that has a one or two-word (or short) answer. his strategy engages all students in answering a question without disrupting the flow of their assimom.					
Model	The teacher or student demonstrates exactly how to complete a task. The rest of the classican ask questions before repeating what was demonstrated. This strategy allows the teacher to review any safety concerns or difficult aspects of a task, as well as share advice for task completion. This method should not be used for some inquiry activities as it could over influence the direction of student thinking					
One Stay One Stray	After working with partners, one person stays with the work product to present to other students while the second partner walks around and listens to pears in the class share. Then the two students switch notes, using the strategy, both partners get to share their project and listen to others share.					
Popcorn	Callian one student to answer a question. After the student has answered the question, they say. "Popogni," and say the name of another student it is now the furn of that student to answer the question, then pick a new student, and so or if a student has responded they should not be called upon a second time but no the same Popognia activity.					
Relay Race	Enuite the class into teams and have then the upsing either Callone student from each feam to the front of the class. Ask students a question and the first to answering the student goes to the end of the ine and the next student goes to the front of the room. A variation for math problems is for students to complete only one part of a math problem at a time					
Shake It Share It High Five	Students move around the classroom until the teacher signals to stop. Students then pairing with a nearby student. Pairings shake hands, share ideas or won products, then high five before their ng around again to find a new partner. This strategy gets students out of their seats and moving, white also a lowing them to share with classifies they do not sit near					
Shoulder Pariners	Students lean and talk querily with the person sitting next to them. Shoulder Partner can be used iterally to just talk to the people sitting on either side, or it can be used for slightly larger groups of three of four with everyone's shoulders "touching." (This promotes the ability to speak softly—in sort of a huddle)					
Think Aloud	The teacher moders a process of thinking by speaking aroud what is thought. As an example, "I think in each more color here in my drawing." This strategy moders for students the type of thinking they can use in an upcoming activity.					
Snowball Fight	Students respond to a prompt using a half sheet of paper. The student crumple the paper up like a snowball and tosses it across the room. Students pick up a snowball that lands close to them ladd their comment or answer and crumple toss again. Repeat as needed. The strategy encourages students to interact with the literal of students will be not still rearby in an arionymous manner.					





Instructional Strategy Name	Brief Description			
Think Time	Teacher a lows a distinct pened of sience so that students can process tasks the ings, and respectses. Allow students 15 to 30 seconds to think to themse ves perfore calling the anyone to provide an enswer to the class. This strategy is particularly helipful for shy or quiet students as we as students who prefer to process content individually before confirmating to a classroom or group conversation.			
Thumbs Up	The teacher can quickly sheet for understanding using this strategy Students no cithumbs up for agreement and thumbs down for disagreement to a question asked by the teacher. Thumbs up can also be used as a way for students to signal to a teacher that they are ready for an instruction. Thumbs Down should never be used to denote disagreement with a student's answer or idea.			
Turn and Talk	Students turn "knee to knee" and "eye to eye" with a Shoulder Partner to discuss answers to long-form questions. This strategy allows situdents to discuss ideas reflect on eaching, and oneck each other's answers.			
Venn Diagram	Teacher draws two or more large over apping once as a graphic organizer to show what is the same and different about multiple topics. Teacher notes similarities in the over apping section of the offices, then summarizes differences in the espective parts of the circles that do not over ap. This strategy allows students to visitally see and record similarities and afferences.			
Wait Time	Similar to the Trink Time strategy, the teacher waits at least seven seconds after asking a question to the whole class or after to ing on a student to respond. This provides time for students to think independently before an answer signer to the local			

Differentiated Instruction

Primary 4 Mathematurs Techbook allows teachers to differentiate instruction, degrees of readness, and interests. Techbook also offers resources to help vary content, process, product, and reaming environment through the core instructions, path way

But upon the print ples of universal Dasign for Learning Primary 4 Mathematics Techbook features a variety of content types, including mages, video, text and mands. On Activities. These resources, included in both digital and print provide multiple representations of the content and the flex bility for teachers to assign targeted content to whole groups or individual students.

100

Primary 4 Mathematics Scope and Sequence

An • no cates initia introduction of content. Practice and application should continue be, individual instruction

rimary 4 * THEME	1	2	3	4
		<u> </u>	-	
. Numbers and Operations in Base Ten				
. Apply and extend understanding of the place value system to multi- whole numbers	dig t			
Demonstrate understanding that in a multiplicit who enumber, a digit in one place represents tendines what it represents in the place to its right.	•			
b. Explain place value using numbers to 1,000;000,000, noticing the relative sizes of numbers in each place.	•			
 Read and write numbers up to a mill and (bl.lien) using numerals, word form, and expended form 	•	•		
 d. Use place value understanding to round multiplicity whole numbers up to the milliards (b.II.org) place 	•	•		
Order a set of numbers up to a min and (billion)	•			
 Compare two multidigit numbers using the symbols < > = to express the relationship 	٠			
 Use place value understanding and properties of operations to part multidigit antimetic 	व्याग			
a. Fivently add and subtract multiplight whole numbers		•		
b. Multiply a whole number of up to four digits by a one-digit whose number using strategies based on place value and the properties of operations	•	•		
 Multiply two two-digit numbers, with and without regrouping using strategies based on place value and the properties of operations 	•	•		
d. Find whole-number quotients and remainders with up to four-digit a vidends and one-digit a visors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.		•		
. ustrate and explain calculations using equations or mode s				

Scope and Sequence

ICKK

Primary 4 • THEME	1	2	3	4
3. use place value to read and write decimals to the Hundredths place			,	
a. Read and write decimals to Hundre 3ths using numerals, word- form, and expanded form			•	
b. Use mode sito i ustrate and compare datimals to Hundredths			•	
3. Numbers and Operations – Fractions and Decimals				
Exter a understanding of fraction-equivalence and broating				
a. Explain cases of fraction equivalency by using year, fraction models			•	
b. Explain how the number and size of the parts of equivalent fractions differ even though the two fractions themse ves are the same size				
c. , dent. fy and generate equ. va ent fract. one.				
d. Compare two fractions using different strategies (for example by comparing two fractions with different numerators and different denominators by creating common denominator or numerators of comparing to a benchmark fraction)				
 Demonstrate understanding that fraction companisons are yalld only when the two fractions refer to the same whole 			٠	
L Bu difresions from unit fractions				
 Demonstrate dispersionaling of fraction with a > 1 as a sum of fractions to Explain adorton and subtraction of fractions as joining and separating parts referring to the same whole. 			٠	
 Decompose a fraction into a sum of fractions with the same concernator in more than one way 				
b. Add up to three fractions with like denominators where one of the fractions is a unit fraction			•	
c. Add and subtract fractions and whole numbers			•	
d. Add and subtract mixed numbers with the denominators using equivalent fractions or properties of operations and the relationship between addition and subtraction				
 So ve were problems involving addition and subtraction of fractions referring to the same whole and having like denominators 			•	

ICOX II



	1	2	3	4
f. App y and extend previous understandings of multiplication to multiply a fraction by a whole number	•			
1,Demonstrate understanding that fraction g is a multiple of \$				
2) Demonstrate understanding that a multiple of $\frac{2}{5}$ is a multiple of $\frac{1}{5}$, and use this understanding to multiply a			•	
fraction by a whole number 3) Sowe word problems hyove multiplication of a fraction by a whole number using numerals, words, and modes				
Understand decimal-notation for fractions, and compare decima for	actions.			
• Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100 (for example express to as 100 and add 10 + 100 100)			•	
b. Use decima, notation for fractions with denominators 10 or 100 (for example, write 62 as .62)			٠	
c. Compare two decimas to the Hundredths place			•	
d. Demonstrate understanding that derinal comparisons are valid only when the taxe decimals refer to the same whole			٠	
Record the results of decimal comparisons using the symbols			٠	
Operations and Algebraic Thinking				
use the four operations with whole numbers to solve problems.				
a. Interpret a multiplication equation as a comparison flor example, $42 \div 7 \times 6$ as a statement that 42×7 times as many as 6)	•	•		
b: Represent verbal statements of multiplicative comparisons as multiplication equations	•	•		
c. Multiply or divide to some word problems involving multiplicative companion. (for example, using drawings and equations with a symbolitic the unknown number to represent the problem)	٠	•		





Pri	imary 4 • THEME	1	2	3	4
	d. Solve multistep word problems posed with whole numbers using the four operations, including problems in which remainders must be interpreted			,	1
	1) use letters in equations to represent un known quantities				
	Assess the reasonableness of answers as ng-memal computation and estimation strategies including rounding.	•	•		
	f. Follow the standard order of operations to solve equations with multiple eperations	•	•		
2.	Gein familiarity with factors and multiples.				
	a. Demonstrate understanding that a whole number is a multiple of each of its factors. 1) Find an factor pairs for awhole humber in the range 1–100.		•		
	b. Find common multiples between two numbers.		•		
	c. Find the greatest common factor between two whole numbers		•		
D.	Measurement and Data				
1.	Solve problems in to ving measurement and conversion of measureme	D#S			
	Demonstrate understanding of relative sizes of measurement units within one system of units including length (mill meters, deptimeters, declineters, meters, interest in ognams, tons), capacity (mill meters), and time (second, minute, hour, day)	•			
	 Use the four operations to solve word problems involving distances, intervals of time, riquid-capacity, masses of uplacts and money 	•			
	c. Represent measurement quantities us not diagrams such as number, ne diagrams that feature a measurément scale	•			
	d. Apply the area and perimeter formulas for rectangles in real world and mathematical problems	•		•	
2.	Ask and answer questions by collecting, organizing, and representing appropriate data.				
	Select and make an appropriate graph to display a data set of measurements in fractions of a unit (for example, line plot, bar graph, or obuble bar graph.			•	

XXXX

(A)
ALC:

1	2	3	4
b. So, we problems involving addition and subtraction of fractions by using information presented in graphs (for example, from a line plot find and interpret the difference in height between the talest and shortest students in the classroom)		٠	
Geometry			
Draw and identify lines and angles, and classify shapes by properties of their nessand angles.			
a. Identify points, lines, and angles in two-dimensional figures			1
 Demonstrate understanding that angles are geometric shapes that are formed wherever two rays share a common endpoint. 			+
c. Draw points, lines, line segments, rays, angles (right, acute, obtuss), and perpendicular and para is lines			1
d. Classify two-dimensional figures based on the presence or absence of pala let or perpend chiar thes, or the presence or absence of angles of a specified size			
 Demonstrate understanding of right thengies as a category, and identify right triangles 			
f. Recognize a line of symmetry for a two-dimensional figure as a fine across the figure such that the figure can be folded along the ne lipto matching parts.			1
g. Identify Inc-symmetric figures and draw lines of symmetry			+
Germet c measurement understand concepts of angle and measure angles			
a. Demonstrate understanding that an angle is measured with reference to a clinice with its center at the common endpoint of the rays by considering the fraction of the circular between the points where the two rays intersect the circular			
1, An arrigle that turns through and of a circle is called a lone-degree and the			1
 An angle that turns through nighted degree angles is said to have an angle measure of nidegrees 			
b. Use non-standard tools to measure and draw and, as fior example paper mode's and analogic ocks)			
■ Use a protractor to measure angles of 30°, 45°, 60° and 90°			J



1

PLACE VALUE

Theme 1 Number Sense and Operations

Unit 1 Place Value

ESSENTIAL QUESTIONS

- How do place values relate to each other?
- How can the value of a digit change?
- How can we compare and order very large numbers?
- I how can luse what I know about place value to make it easier to work with and understand arge numbers?





Video Questions

The Unit 1 Opener Video, Mightly Ant Facts, Uses antifacts to introduce students to very argenumbers in this unit, students are introduced to Omar and Mariam, two students who are amateur myrmecologists. A myrmecologist s someone who studies ants. As part of their ant study project, they find ant to onless study and behaviors, and count ants to trace populations and the Trealth and variety of deal anticolonies. This research requires them to count, read, write, and compare very big humbers.



Cultin Code agret4.)..8

- How can we use what we arready know about place value to learn about numbers to the M Jards place?
- What strategies can we use to read and write really big numbers?
- How can we use place value to compare and orderirearly big numbers?

Key Vocabulary

As attidents investigate real-world situations, they will develop anunderstanding of and be introduced to the following key vocabulary

accurate, amateur, ascending, compare, compose, decompose, decomposed form, descending, digit, efficient, equal to, error analysis, estimation, expanded form, from end estimation, greater than, less than, milliand, myrmecologist, nearest, number, numera, order, period, place values, reasonable, rounding, standard form, word form



Ou ak Code egmt4050

Unix 1 Place Value



Unit Storyline



Unit 1 Place Value Storyline

The Place Value unit extends students' working knowledge of whole numbers and the place value system in the context of comparing and rounding numbers. Students apply these understandings to large numbers (to the billions, or milliards). To support learning, students observe video footage and investigate problems of ants within colonies to enhance their knowledge of whole numbers and place value within large numbers.

Unit Standards

4.A.1	Apply and extend understanding of the place value system to multi-digit whole numbers
4.A.1.a	Demonstrate understanding that in a multi-digit who e number, a digit in one place represents ten times what it represents in the place to its right
4.A.1.b	Explain's ace value using numbers to 1,000,000.000, including the in stave sizes of numbers in each place.
4.A.1.c	Read and write numbers up to a milliand (billion) using numerals, word form, and expanded form
4.A.1.d	use place value understanding to round multi-digit who is numbers through the One Milliard (One Billian) place
4.A.1.a	Order a set of numbers through the One Mill. and (One Billion) place
4.A.1.f	Compare two multi-digit numbers using the symbols <, >, = to express the relationship
4.C.1	Read and write numbers up to a milliand (billion) using numerals, word form, and expanded form
4.C.1.a	Interpret a multipossition equation as a comparison (for example, $42 + 7 \times 6$ as a statement that 42×7 times as many as 6)
4.C.1.e	Assess the reasonableness of answers using menta, computation and estimation strategies including rounding

Unit 1 Structure and Pacing

This structure and pacing guide is based on a Mathematics program that is 60 minutes/5 days a week. See-the Alternate Pacing Guides for recommendations for 45-minute and 90-minute ressons.

If Mathematics instruction is based on 60 minutes/5 days a week, deliver the lessons as written in the Teacher Edition.

Concept 1: Reinforcing Place Value

Essential Questions

Lesson 1

Lesson 2

- How pahil use mathematical vocabulary to build understanding of place value?
- How does the value of a digit change as timoxes mis whole number?
- How does the value of a digit change as timoxes one place to the left within a whole number?
- How canonumbers be broken apart?
- How does breaking numbers apart halp us understand them?

Review Digit, Numeral, Number

Learning Objectives

- Students will explain the difference between a digit, numeral, and number
- Students will discuss how the value of a digit can change

Student Learning Targets

- I'van explain the difference between a digit, numeral, and number
- I can discuss how the value of a digit can change

Really Big Numbers!

Learning Objectives

Student Learning Targets

Students will identify a whole number place values through the One Millard place
Students will explain how the value of a digit changes based on its place in a

number

- I can dentify an whole humber place values through the Orie Milliard place
- · I can explain how a dign's location in a number affects its value

Unit I Place Value

Unit Structure and Pacing cont'd

Changing Values

Learning Objectives

Lesson 3

- Students will explain from the value of a digit changes as it throves to the eff in a whole number
- Students will describe patients they observe in changing place values

Student Learning Targets

- . I can exp ain now the value of a diditionanges as it moves to the left in a number
- I can describe the patterns , see as a digit changes value

Review Comparing Values

Learning Objectives

Lesson 4

- Students will explain the relationship between a given place value and the place value to its reft.
- Students will use multip leation to compare place values.

Student Learning Targets

- can explain the relationship between place values.
- I carriuse multiplication to tempare place values.

Many Ways to Write

Lesson 5

Learning Objective

Students will write numerals in standard, word, and expanded forms

Student Learning Target

I can write numerous in standard, word, and expanded forms

Composing and Decomposing

Lasson 6

Learning Objective

Students will compose and decompose numeras in multiple forms

Student Learning Target

lean bu .d and break down numerals in multiple forms



Learning Objective

Students will work to correct missomorphions and errors related to place value.

Student Learning Target

lean correct my misconceptions and emors, related to place value

Concept 2: Using Place Value

Essential Questions

- How can we efficiently compare and order very arge immibats?
- How can understanding place value help us order very large numbers?
- How does estimating help me solve problems?
- How can place value help us understand rounding?

Review Comparing Really Big Numbers

Learning Objectives

Lasson 7

- Students will use prace value to compare range numerals
- Students will use symbol's to express numerical comparisons.

Student Learning Target

I can use symbols and place value to compare large numeras.

Comparing Numbers In Multiple Forms

Learning Objectives

Lasson 8

- · Students will compare numbers in multiple forms
- Students will describe strategies for comparing numbers in multiple forms

Student Learning Targets

- I can compare numbers in multiple forms.
- I can describe the strategies if use to compare numbers

Unit I Place Value

Unit Structure and Pacing cont'd

Descending and Ascending Numbers

Learning Objectives

Lesson 9

- Students will digger numbers in multiple forms.
- Students will describe strategies for ordering numbers in multiple forms

Student Learning Targets

- Foar order numbers in multiple forms
- · I can describe the strategies I use to order numbers

Predicting the Unpredictable

Learning Objectives

Lesson 10

Lesson 11

- Students will explain front end estimation.
- Students will use front-end estimation to approximate large numbers

Student Learning Targets

- can explain front end estimation with numbers in multiple forms.
- can use front end instination with numbers in multiple forms.

Rounding Rules

Learning Objectives

- Students will apply multiple strategies to round numbers
- Students will discuss whether founding or front-end estimation provide a more accurate estimate

Student Learning Targets

- · | carruse multiple strategies to round humbers
- Lean (dentify which estimation strategy provides more accurate estimates)

Concept Check-In and Remediation

Learning Objective

 Students will work to correct infeconceptions and errors related to comparing ordering, and rounding numbers

Student Learning Target

 can correct my misconceptions and empire related to comparing, ordering and rounding numbers

Alternate Pacing Guides

If Mathematics instruction is based on 45 minutes/5 days a week, do the following:

Reduce ACCESS by 3 minutes

Reduce Bull D by 8 minutes

Reduce CONNECT by 2 minutes

Reduce WRAP-uP by 2 minutes

Strategies for reducing time in each section:

- Discuss fewer examples
- · Eliminate Shou der Partner conversations
- Shorten class discussions
- Work with students to complete ACCESS problems

If Mathematics instruction is based on a combination of 45 minutes/4 days a week and 90 minutes 1 day a week, do the following:

Follow the 45 minute approach for the 45-minute days

Teach two 45-minute lessons on the 98-minute day

If Mathematics instruction is based on 90 minutes/5 days a week, do the following:

horease ACCESS by 5 minutes

Increase BU LD by 20 minutes

Increase CONNECT by 3 monutes

mercase WRAP - P by 2 minutes

Strategies for increasing time in each section:

- Discuss additional examples as needed
- Extend crass discussions
- Allow time for hands-on work with manipulatives and models
- Provide additional practice problèms foit students who need additional practice
- Encourage students to shall and mode, their problem-sowing strategies.

United Place Value

Mathematical Background Knowledge

Place Value

If Primary 4, Suiderits expand their understanding of numbers as they explore very anjer and very small numbers throughout the year. To ensure a four dation for reading, creating, companing, and performing operations with these numbers, situate is begin by learning to differentiate between the terms digit, numeral, and number. This enables them to use accurate mathematical anguage and communicate dearly about large and small numbers. A digit is the single symbolused to make numerals. We use the digits 1, 1, 2, 3, 4, 5, 6, 7, 8, and 9 every day. A numeral represents the dear of a number. Number is the quantity we associate with a numeral. The distinctions in terminology in math relate to distinctions in anguage. The letters cart make the word cat, which correlate with our understanding of the animal represented by the word "cat." The digits 2 6-1 make the number "20".

Une way to help students uncerstand these concepts is to explain that different languages use different digits and number systems to create numerals. For example

Hindu-Arabic	0	1	2	3	4	5	6	7	8	9
Eastern Arabic	•	ħ.	x	¥	£	0	Ť	V	А	٩
Ancient Roman		1	11	111	IV	٧	VI	VII	VIII	IX
Chinese	0				四	¥	А	t	Л	九
Ancient Greak		a'	β.	Υ'	δ'	ε′	5'	ζ'	η'	6'

In Primary 3, students teamed place values up to the hundred Thousands place, in Primary 4, students extend this understanding to periods in place value and the One Millard place. The goal is for students to connect their new learning about place value to prior learning and to extend their understanding to read, write, and compare larger numbers.

Relationships in Place Value

Students also explore the relationship between each place value as digits move to the left within a number. They multiply by powers of "10 and observe patterns in the changing place values. It is important that students develop conceptual understanding of relational size and exponential growth as digits increase in place value.

In firmery 3, soudents team to write numbers in standard, expanded; and word form to the mandred Thousands prace in Frimary 4, students extend this understanding to the One Millard place. They practice creating and writing numbers to One Millard in standard form, word form and expanded form. Expanded form a low situaents a different apportunity to see that the digits used in a number represent a value based on their place value. Students also practice writing mumbers in written form which reinforces how to read aggle numbers.

Composing and decomposing numbers is a very conceptual understanding that the gardents in students' educational career. For example, in Primary 2, students learned different ways to timpose their important companions of 6 + 4 3 + 7, and so on) in Primary 3 students began composing numbers with multiplication in Primary 4, students compose numbers using many strategies including place value, factors, and addition

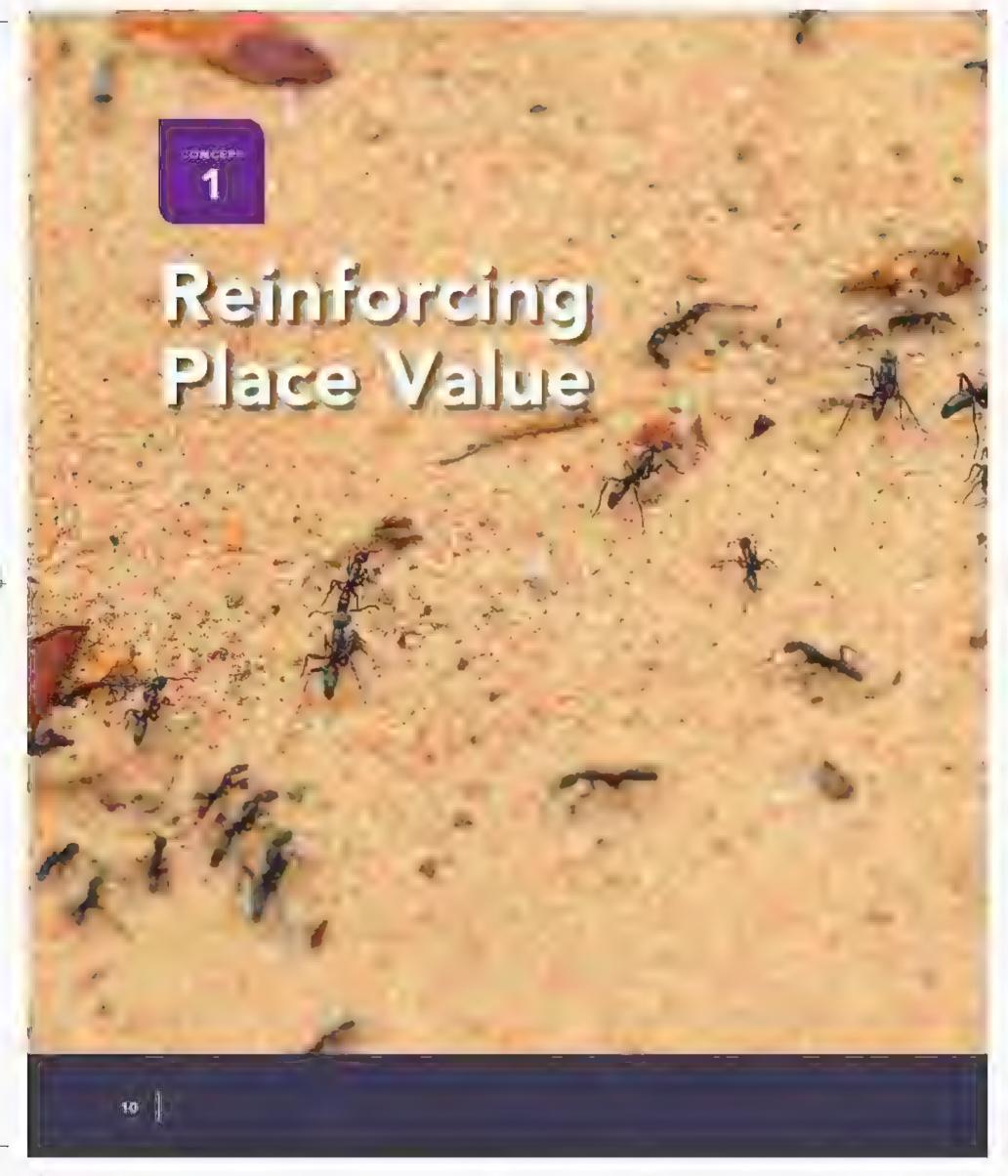
Comparing and Ordering Large Numbers Using Place Value

in Frinary 4, students apply their understanding of piace value to compare and order very arge numbers. However, instead of comparing and ordering numbers only instanded formathey compare and order them in standard, word, expanded, and decomposed forms. This helps students seve op a deeper understanding of piace value relationships. Additionally, students incorporate the terms ascending and descending into their mathematical vocabulary.

Estimating Using Place Value

in Primary 4, Students review front-end estimation and apply that strategy to very large pumbers in multiple forms. They review rounding and use different strategies to round pumbers through the One Mulard place. They compare estimation strategies to identify which strategy provides the most accurate estimate. This helps them understanding the value of estimations—determining whether their answers are reasonable.

Unit 1 Place Value



Concept Overview

In Concept 1: Reinfording Place Value, students investigate relationships between places in a place value chart, specifically now much adigit changes in value as it moves to the left within a whole number. Students review composing and decomposing numbers and apply their understanding to reading and writing numbers to the One Mullard place. These place we us connepts help students master more challenging concepts in Primary 4, including multiplication, division, fractions, and decimals.

Concept Standards

- 4.A.1 Apply and extend understanding of the place value system to multi-digit who enumbers
- **4.A.1.a** Demonstrate "Inderstanding that in a multi-digit whole is imper, a digit in one place represents tenit mes what it represents in the place to its rigit.
- **4.A.1.b** Explain place válde using numbers to 1,000,000,000, including the relative sizes of numbers in each place.
- 4.C.1 Read and write numbers up to a mil lard (bl. ion) us ng numerais, word form and expanded form
- **4.C.1.a** interpret a multiplication equation as a comparison (for example, $42 \approx 7 \times 6$ as a statement that $42 \approx 7$ times as many as 6)

Consept 1 Reinforcing Place Value

Concept Planner

All lessons are designed to be 60 minutes. The materials tisted in this chart are items to gather for each group. Items for the class or for individual students are indicated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
1 Beview Digit, Numeral Number	Thotecards or paper (1 per student) Lessor 1 Sorting Cards (Photocopy the Blackline Master)	Digit Numera Number	Students will explain the difference between a digit, numeral, and number Students will discuss how the value of a digit, can dishge
2 Really Big Numberd	Place Vene-Chart (Project or recreate on brackboard) Digit Cards 0-9 (1 set per student. Photocopy the Black ine Master and have the students keep these for future ressure). Subsorts (1 per student)	Digit. Mulland Period Place value	Students will dentify all, whole number place values through the One M fiand place Students will explain now the value of a digit changes based on its place in a number
3 Changing Values	 Place Value Chart through the One Milliard place (Display on board) Tens Rods (2 rods per student. Use Base Ten Blocks or phetocopy the Black he Master and cut apart the rods) Large Digit Cards 1" 9 (1 set for the teacher. Photocopy the Black he Master and save for future lessons) 	Amstellir M taro Myrmeco og st Period P ace value	 Students will explain how the value of a digit changes as it moves to the eff in a windle number Students will describe patterns they observe in changing place values.





- Students often use the terms digit, numeral, and number and interchangeably even though they have distinct of flerences
- Students often use the term number when referring to numerals. Since this is a common error, we understand each other. However, the term-digit is distinct.
- Students often look at digits without considering their place value. Where the digit fairs in a numeral is official to industriated by its value.
- Students may not understand that the position of a digit in a numeral determines its value
- Students may not recognize that there are relationships
 between place values. For example, in the number 333, the
 value of the 3 in the Tens place is 10 times greater than the
 value of the 3 in the Ones place. The value of the 3 in the
 Hundreds place is 10 times greater than the value of the 3 in
 the Tens place.
- Students may struggle to read large numbers correctly ut larg Ones, Thousands, Millores, and Millards
- Students may not understand that the position of a digit in a numeral determines its value
- Students may not fer ogn as strat there are relational ps
 between place values. For example, in the number 3.3, the
 value of the 3 in the Tens place is 10 times greater than the
 value of the 3 in the Ones prace. The value of the 3 in the
 Hundreds place is 10 times greater than the value of the 3 in
 the Tens place.
- Students may struggle to read large numbers correctly utilizing Ones. Thousands, Millions, and Milliards



Opportunities for Formative Assessment

Writing About Math, Vocabuary Builder, Practice, Check You Understanding

Reading the Place Value Chart, Creating Really Big Numbers, Writing About Math, Fractice, Check Your ungerstanding

What is My Value? Exploring Place Value Relationships, Multiplying Ants Writing About Math Practice, Check Your Understanding

Concept 1 Reinforcing Place Value

1

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives	
Review Compating Values	 Place Value Chart through the Que Milliard place (Display on board) Base Ten Blocks or place value man pulatives, plus one large set for the teacher 		Students will explain the relationship between a giver place walue and the place value to its	
	o Base Ten Manp, atives are ava able at the and of the		eft • Students wir use multipocation to	
	a A low time for students to cut out tire man pulst ves or have them do infor homework prior to this lesson		valtes	
	o Store manipulatives for future			
	 Digit Cards 1-9 (1 set per student, kept from Lesson 2) 			
	 Large D.gn Cards 1-9 (1 set for the teacher Photocopy the Blackline Master.) 			
Marry Was to Write	Dight Cards 0-9 (1 sat per student, kept from Lesson 2)	Expanded form Standard form Word form	Students Williams in standard, word, and expanded forms **The content of the co	
6 Complesing and Decomposing	 Place Value Chart through the One M. Hard place (Display on Exard) We Have/Who mas? Cards (1 set) and Answar Key (For the teacher) (Photocopy the Blackine Master). 	Compose Decomposed form Expanded form Standard form Word form	Students will compose and decompose numerals in multiple forms	

Concept 1 Reinforcing Place Value

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1	and the second				
			e. @	 - 2	

Lesson	Materials for Lesson	Vocabulary	Learning
Name		Terms	Objectives
Concept Check which Remediation	Materias Will Yary	• Revew vocabilary terms as needed	Students w Work to contect Introductapt one and Prace val.e prace val.e

Opportunities for Assessment:

in add from to the assessment opportunities included in this chart, each concept will include a Concept Check-in



Common Misconceptions and Errors

- Students may not understand that the position of a dignilinal numeral determines its value
- Students may struggle to read large numbers correctly ut and Ones, Thousands, Millions, and Millards
- Students may be able to country the place values and per sos but may not recognize the pattern or relationship between each place
- Students may be confused about how to represent a place value with a 9 digit in exprended form
- Students may struggle to say range numbers and need to be commided to group the numbers into periods as they read their aroud
- Students may not be sure how to represent a zero in a place when the number is decomposed.
- Students may not connect pigits in their place values, expanded notation, and decomposition ulmbers



Opportunities for Formative Assessment

Concept Check- n

Concept 1 Reinforcing Place Value



LESSON 1 Review Digit, Numeral, Number

Lesson Overview

In the first lesson of Primary 4, students explore large numbers in relation to anis. These large numbers aurich the unit as students develop a common and strong understanding of mathematical language for discussing numbers. They then apply the numbers and to arge numbers and their values.

Lesson Essential Question

 How-can use mathematical vocabulary to build understanding of place value?

Learning Objectives

In this lesson

- Swidens will explain the difference between a digit.
 number, and numeral
- Students will discuss how the value of a digit can change

Grade-Level Standards

4.A.1 Apply and extend understanding of the place value system to rullfilled git whose numbers

4.A.1.b Explain place value using mumbers to 1,000,000, including the relative sizes of numbers in each place.



didity number, numera,



Materials List

- Notedates or paper
- . Tessom I Sorting Cards



Preparation

Photocopy the Blackine Waster at the end of this volume.

DIGITAL



Review Digit,
Numeral, Number

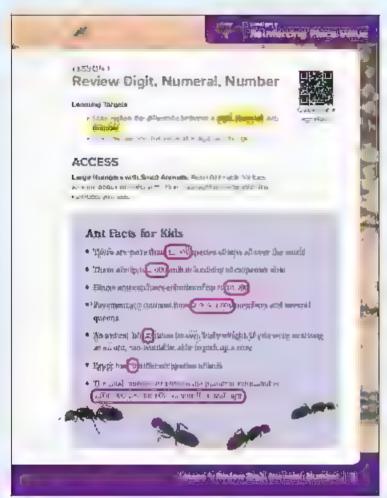


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Student Page 3



ACCESS (10 min)



reference to the second second

- Students ofter use the ferms digit, numeral, and number interchangeably, even though they have distinct differences.
- Students ofter use the term number wher referring to humanes. Since this is a common error, we understand each other, but it eltern a did is distinct.
- Students often contail digits without considering their place value. Where the digit falls in a manera is cut as to undessanding to value.

Large Numbers with Small Animals

- Direct students to Lesson 1 ACCESS Large Numbers with Small Animals. Ask volunteers to read aloud the reading passage Ant Facts for Kids.
- 2 Ask students to highlight or circle the numbers in the 1st of facts.
- Expain to students that they are beginning Primary
 Mathematics with a focus on large numbers
 reading them, writing them, and comparing them
- Ask for volunteers to explain why ants might be a good topic to explore while learning about large numbers. Explain that ants are discussed again in future lessons. Encourage students to make connect one between what they are learning in Science and Math

Lesson 1 - Review Digit, Numeral, Number



1 Reinforcing Place Value

BUILD (40 min)



Numeral Building (20 min):

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The assessment of the Chistoderics as what a composite the transfer to the composite and the composite and the composite and the composite and the composite the composite and the composite

- 1 Direct students to Lessen 1 BuilD Numera Building
- 2 histricatist. Carries the Writer any large mumbers in the box (or on a present paper)
- 3 Ask students to compare their numeral with their Shoulder Partner to determine whose numeral is bigger and discuss how they know
- 4 Repeat as many times as desired, asking students to find another partner by we king around the room or by swapping numerous with someone seated nearby
- The Ask students to share from they figured out which murmeral was biggest murmeral in the class? What was did they not se?

Vocabulary Building (20 m.n)

 Write-the-following on the blackboard or project on a whiteboard

Digit:	
Numeral	
Number	

2 Direct students to Lesson 1 Bund Vocabiliary Building: Ask students to do a Quick Write to define each vocabulary term in their own words. Remind students that it is okay to take a best guess and write what they know.

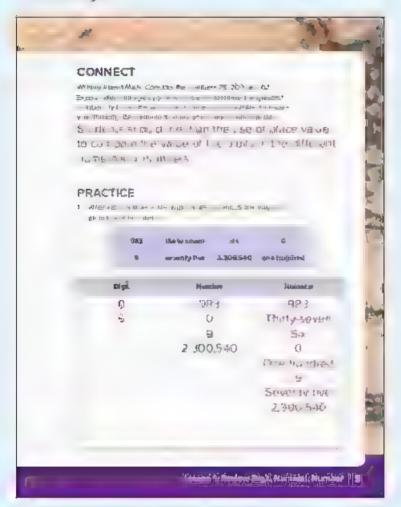
Amenders we vary it is only if students do not how the lieffind at this time.

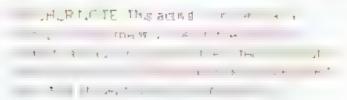
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- 3. Ask students to read the Learning Tangets for the lesson and reflect on how well they can meet the targets right now. Consider asking students to self reflect using a Fishto-Five, where "fist" indicates no understanding and "five fingers" indicates a deep understanding of all terms. Discuss, if needed
- 4. Disp ay one serting card at a time. For each card, give students a moment to discuss with the r. Shoulder Partner in which column the card aclengs digit, numeral, or number? Then ask students to share their answers with the whole group. Discuss/question-students thinking if a students do not agree.



- Why do you believe this card belongs there?
- Could a also belong somewhere else?
- Why does it not belong in the other column/s?
- Does this card fit into more than one column?
- 5. Complete the task with as many sorting eards as desired. Ensure all sorting cards are properly placed.

 A to ar #4, two hundred, 35,446,768 three should four hundred tivelve. 5, fore-hims, 45,646,70,000,000,1 eacht, one multion.
- 6. As a group, define each term together based on what was learned during the experience. Record the defin tions in the table on the board. (Refer to the q assary as needed.)
- 7 Ask studients to write the class definitions of the terms digit, numeral, and number

 1 5 1 15 11 5 11 5 11 5 11

CONNECT (6 min)



Direct students to besson I CONNECT Writing About Math and ask their to respond to the prompt.

WRAP-UP (4 min)



(Let's Chat About Our Learning

After a few minutes of independent writing, ask volunteers to share their ideas. Reinforce place value concepts and correct use of the terms. Remind students that using accurate mathematical anguage can help them communicate their thinking more clearly Students should meet on the use of place value to compare the value of the digits in the different numerals 的型面**的**問題[15]

PRACTICE

Direct students to Lesson 1 PRACTICE and have them combiliate the problems. Address student entons and misconceptions around digre, numbers, and numera,s

Check Your Understanding

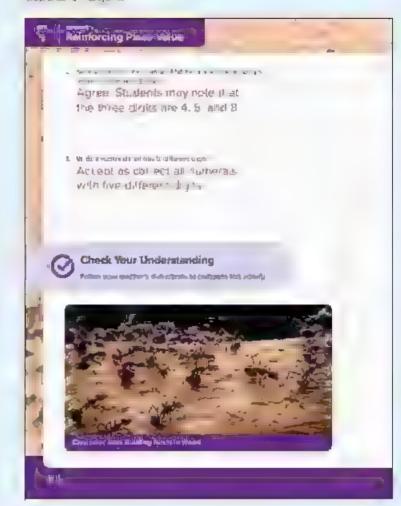
1. Challe all the numerals pelow

seven,	Xxxxxx	3#5	forty-gine	te dogŝ	J
704		1), 343,542	addition	twenty-six	2

2. Compare the numbers below and circle the greatest

Use the following digits to make the largest number possible: 2, 8, 9, 4, 6, 86 41.

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Materials List

- Place value chart (Project or jedeate on) blackboard)
- Digit cards (-) (it set per student)
- Scissofs (4 per student)



Preparation

Keep the digit parts for future lessons

DIGITAL



Really Big Numbers!



egrint4002

LESSON 2 Really Big Numbers!

Lesson Overview

In this lesson, students review place value concepts they learned in Primary 2 and Primary 3 and apply that earning to building understanding of place value. through the One Millard place. They play a game to practice creating, reading, and writing large numbers

Lesson Essential Question

 How does the value of a digit change as it moves in a whole number?

Learning Objectives

in this lesson

- Students will dentify all whose number place values through the One Mill and place
- Students will explain from the value of a digit. changes based on its place in a number

Grade-Level Standards

4.A.1 Apply and extend understanding of the place value system to multi-digit who enumbers

4.A.1.b Explain place value willing numbers to 1,000,000,000, Including the relative sizes of numbers in each place



Vocabulary Check-In

digit milliard, period, place value

Lasson 2 . Really Big Numbers!



ACCESS (10 min)

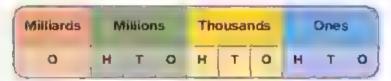


EMELTIC

- Students may not understand that the position of a digit in a numeral determines its value.
- Students may not recognize that there are relationships between place values. For example, in the number 333, the value of the 3 in the Tens prace is 10 times greater than the value of the 3 in the Ories place. The value of the 3 in the of the sale of the 3 in the Tens prace.
- Students may struggle to read large numbers correctly utilizing Ones, Thousands, Milliands, and Milliands

Exploring Place Value

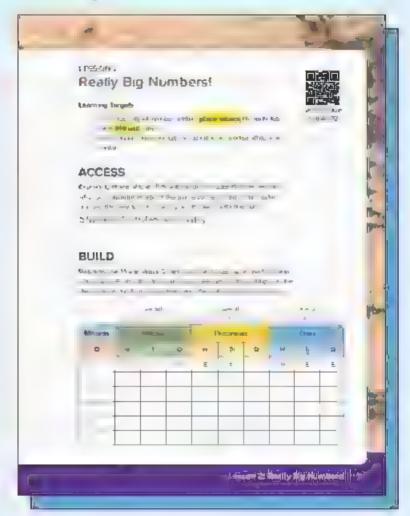
- Direct students to Lesson 2 ACCESS Exploring Place Value Ask students to talk to their Shoulder Partner about what they remember from earlier grades about the place value system and record their notes
- 2 Ask a few volunteers to share their ideas Statements thay remember a florent concert: ;
- 3. Project or draw the Place Value chart that follows
 Cover the Millions and Milliard periods. Explain that
 the chart shows the Ones period and the Thousands
 period. Each period contains Ones. Tens, and
 mundreds places. The names of the periods help us
 have numbers.



- 4. Ask students to talk to their Shoulder Partner about things that can be represented by numbers in the Ones of Thousands per ods. (For example, hundreds of students attend the school. Thousands of people we in the community.)
- Reveal the next two periods (Millions and Millards) on the place value chart.

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Student Pages 7-8







- 6. Ask students to oranstorm things that can be represented by numbers in the Milliands periods (For example, millions of people live in Cairo Milliands of people ive in the world).
- .' Display and ask students to read the statement, "For every 1-human on Earth there are about 1,000,000 arts." Allow students to react to the statement. Explain that they wirefuln to that statement at the end of the mathematics period.

BUILD (40 min)

▲R **♣**

Reading the Place Value Chart (20 mm)

- 1. Direct students to Lesson 2 Build Di Reading the Place Value Chart. Have students read aloud with you the pipe of the place value chart. Begin at the Ones period and move through the One Millard Ches, Tens, Hundreds, One Thousands, Ten Thousands, Hundred Thousands, One Millards, Ten Millards, Hundred Millards, One Millards, Hundred Millards, One Millards
- Guide students through practice reading five large numbers and writing them in a place value thant. Write large numbers on the place value thant and help students read them aloud with you. Ask students to record the numbers in their Student Materials. For example, write 35,891,455 and chorally read "to my-five million, eight hundred ninety-one thousand, four hundred fifty-five.") Remind students to say numbers crouped in each period followed by the name of the period (an example is shown below). Continue this practice of reading large numbers unit, most students respond with acquiracy.

Milliards	Millions			7	housand	15		Опез	
0	Н	T	0	н	т	0	Н	T	0
		3	5	8	9	1	4	5	5
	35 million			8:	91 thousar	7वं		455	

3. Ask students to read the first earning target and reflection how well they can meet the target right now. Use a "First to Five," where "first" indicates no understanding and "five fingers" indicates a deep understanding of an terms.

Creating Really Big Numbers (20 min)

- 1. Ask students to Turn and Talk to discuss the following questron is a 2 always worth 22
- 2 Ask wounteers to share their thinking and model exemples on the place value chart
- 3 Direct students to Lesson 2 Bull+D Creating Really Big Numbers. Give students time to put apart the Digit Cards 6–9. Have them write their names or initials on the backs of their cards.

1 Reinforcing Place Value

Tell C C Side at the particular tell particular that students the analysis that students the students that students the students that students the studen

- 4. Ask volunteers to read aloud the directions for the game Creating Really Eig Numbers. Decide whether students will play in partners, small groups, or larger groups and divide them according y
- 5 Give students 16-15 minutes to play. Then, stop and ask one student to write their greatest numeral on the board. Ask students to wak through each digit



- What is this digit?
- What is this digit's value?
- What would happen to the value of this digit if it were here (point to enother place in the numeral)?
- Why did the value of the digit change when its location changed?
- 6 Ask students to share how they determined who had the greatest numera



- What strategies did you use to deate the greatest numeral?
- If you could play this game again, what would you do differently?

CONNECT (7 min)

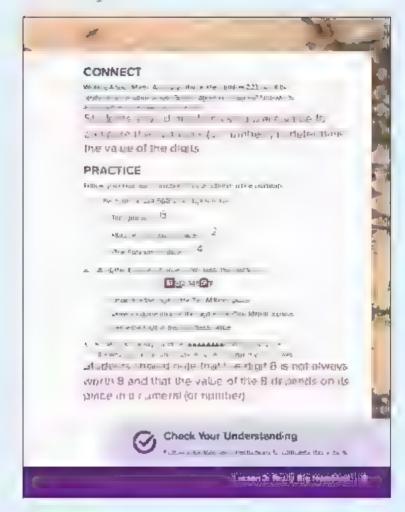


Writing About Math

- Direct students to Lesson 2 CONNECT Writing About Math and respond to the prompt
- 2 After a few minutes of independent writing, ask students to share their answers and explain their tiplinking.

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WRAP-UP (3 min)





One Million Ants!

- 1 Ask students to reflect in the statement shared during ACCESS and then consider the question: If there are 1,000,000 ants for every 1 person, how many people do you think if would take to have one milhard ants?
- 2. Direct students to Turn and Talk to share their to nich a with a friend
- 3 Allow a few students to share and explain their throwing * World's take 1,000 people to have 1 400 000,000 ants ... portion, resident stages to 16.1 - 16.1 d ref. it are mit troute in a martine of dents engage in Sed and thought only as included in the direction of the contraction. The direction of the contraction of th 1, at lave tiple twent 4 at 18 apr

PRACTICE



Direct students to Lesson 2 PRACT CE and have them tomp ete the problems Address student errors and misconceptions around very large numbers

Check Your Understanding

- 1. Use the digits 3, 5, 7, 6, 8, 1, 6, 2 to make the greatest number you can. Then use the same digits to make the smallest number you canwife stept on F 1 ·T9 691 _ 伪, 38
- 2 How did the value of the 2 change from your greatest number to your smallest. number? Why did it change? Use words and numbers to explain your thinking 1-tunere arewered (west on theoretty the interior at a time 2 is a west भार्त क्षित्र का पर के कि का कार्य के कार्य के कि changed as ause the low.com
- 3 How are 23,450 and 230,450 smaller? How are they different? Use words and numbers to explain your thinking to entring real part in the two municers have sign and outs except the second numera has a 0 in the Thousands place making the number much larger
- 4. Estrairee possible values for the align 5 Answers show in include three of the form in 1, 5, 50, 500, 5,000, 50,000, 50,000 5 000 000 50 00 00 00 00 00 00 00 00 at 15 3 000 000

Lasson 2 . Really Big Numbers!



LESSON 3 Changing Values

Lesson Overview

In this essen, students deepen their knowledge of page value. They build on what they learned in Lesson 2 and begin to develop understanding that a did to value changes as it moves to the left within a numeral. They analyze and describe patterns they see in changing values as they begin to investigate relationships between place values.

Lesson Essential Question

 How does the value of a digit change as it moves one place to the left within a whole number?

Learning Objectives

in this lesson

- Students will explain how the value of a olgit changes as immoves to the left in a whole number.
- Students will describe patterns they observe in charts not place varies

Grade-Level Standards

- 4.A.1 Apply and extend understanding of the place value system to multi-digit whole numbers
- 4.A.1.a. Demonstrate understanding that in a multi-digit whose number, a digit in one place represents ten times what it represents in the place to its right.
- **4.A.1.b** Explain place value using numbers to 1,000,000,000, including the relative sizes of numbers in each place.
- **4.C.1.a** interpret a martiplication equation as a compar sore for example, 42 = 7 × 6 as a statement that 42 is 7 threes as many as 6)



Vocabulary Check-In

arnateur, milliard, mymecologist, period, place value



Materials List

- Riace value that Project of re-cleate on board)
- Digit cams 0-9 (1 set per stresent)
- Scissors // per student/



Preparation

Keep the digit cards for future essons

DIGITAL



Lesson 3

Changing Values



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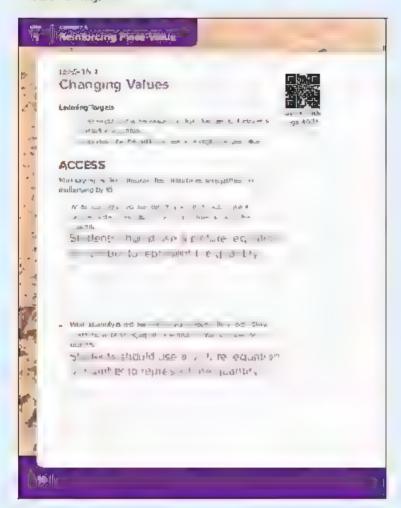






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Student Page 10



ACCESS (10 min)

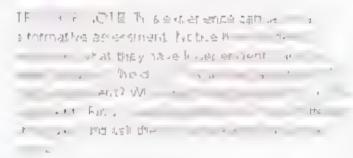


TOTAL TOTAL OF EPTICAL AND FRRORS

 Studients may be able to identify the plane values and periods but may not recognize the pattern of relationship between each place.

Multiplying by Ten

- Distribute 2 Tens rods to each student
- 2 Direct students to Lesson 3 ACCESS Multiplying by Teh. Ask students to read the directions and answer the first quest on
- 3 Help students to form small groups (Shoulder Partners or larger groups). Direct students to work together to determine the quantity they have as a group and answer the second question.



- 4. So we severa problems together using multiplication by 10. Record on the board For example
 - If 5 people were in the small group, how many would there be? How do you know?
 10 50
 - If 11 people were in the small group, how many would there be? How do you know?
 (11 × 10 = 110)
 - How many are there in our whole class? How do you know?
 And you know?
- 5. As students to discuss any patients they observe in the multiplication problems

1 Reinforcing Place Value

The topic Source st. are read a concest at the table to the concest at the table to the concest at the table.

BUILD (40 min)



What is My Value? (15 min.)

- T Display the Lesson 3 Essential Question. Assistudents to read and think about the question how does the value of a digit change as it moves one place to the left within a whole number?
- 2 Ask volunteers to share their ideas. At this time, do not correct any misconcaptions
- 2. Select a slight card (1-9) and hold it up. As if the following questions and have sudents respond charally

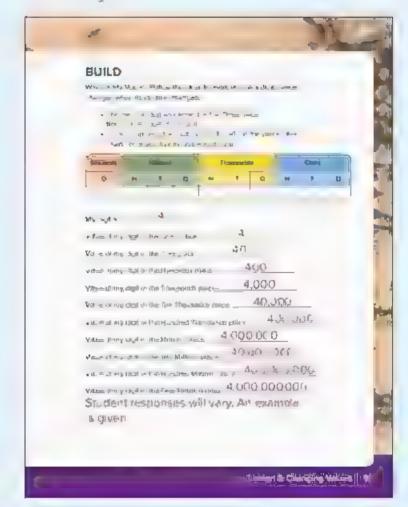


- What value does this digit have when I put it in the Ones place?
- What value does this digit have when I put it in the Tens place?

- 5. Ask students to talk to a Shoulder Partner about the Essential Question. Then, ask students to share with the whole group what they now know about the Essential Question.

 The value of a digit out: larger as it millers in the rest. The left Students may aready notice that it likes larger by Tan times. The will be reinforce that it likes larger by Tan times. The will be reinforce that it likes against experience.

PRINT





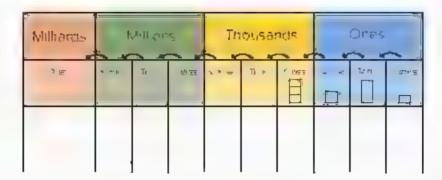
Exploring Place Value Relationships (25 min)

HER NOTE Musing and the tens and musing realise comparisons are imported to the state of the sta

- 1", Remind students that in earlier grades, they used Base Fen Blocks, or hundreds. Tens, and Ones manipulatives. Ask students to talk to their Shoulder Partner about what they remember about this main fool. Explain to students that they are going to use drawings to represent numbers
- 2 Display the place value shart. Draw one circle with the rumber 1- inside. Ask students to count a oud with you as you draw more circles. Stop when you leach 10
- 3. Ask students what happens when they get 10 Ones in the Ones place. They make the Test When they get to 10 Ones, they shall make an applications and those them to the endpoint.
- 4. Draw a box around the 10 Ones to represent regrouping and draw an arrow to the fens place to represent moving the new group to the fens place.
- 5 In the Tens column, draw one circle with the number 10 inside. As a students to count around with you as you draw more circles. Stop when you reach 100
- 6. Ask students what happens when they get 10 Temp in the lens place to dema droud how that they was a see to the and they should they should the mand move them to the Hundreds place.
- 7 Draw a box around the 10 Tens to represent regrouping and draw an arrow to the Hundreds place to represent moving the new gloup to the Hundreds place
- B. Repeal this process with the hundreds place (See the example that follows)

Milliards	Millions			Th	ਰਪਤਰ	nds		Ones	
0	H	Ŧ	0	I	Ŧ	0	I	Т	0
						Ó	0000000000	0000000000	<u> </u>

- Ask students to talk to their Shoulder Partner about the pattern they notice. Reinforce that each time we move to the left in a numeral, the value of digits gets 10 times larger if necessary, write the following on the board $10 \times 1 = 10$, $10 \times 10 = 100$, $10 \times 100 = 1,000$.
- 10. Direct students to Build Exploring Place Value Relationships. Write-on the place value chart on the board to show that each place increases in value 10 times as they move to the left. (See example that follows) have students record the same information in the left of the control of the same information.
- 11. Ask students to answer the question in the Student Materials: As a digit moves one space to the left on the place value chart, its value increases by 10 times



12 Reinforce by recording the following on the board and reciting the pattern chorally Repeat as many times as needed to help students understand. Ask students to discuss the patterns they see in the answers

Students should mention patterns is at a the the number of zerois in the answers

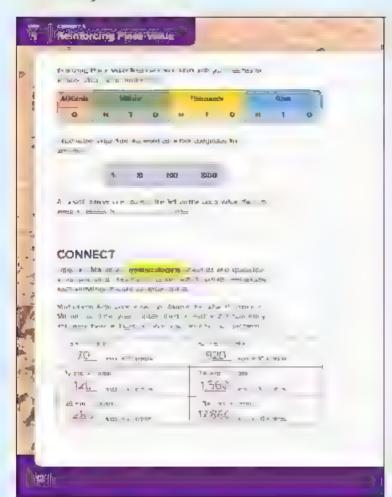
- I. Ten is 10 times as much as 1 One, 10 x 1 = 10
- 1 mandred is 10 times as much as 1 Ten 10 × 10 = 100
- 1 Thousand is 10 times as much as 1 Hundred, 10 x 100 1,000
- 1 Ten Thousand is 10 times as much as 1 Thousand 10 x 1,000 = 10,000
- I mundred Thousand is 10 times as much as 1 fen Thousand, 10 x 10,000 iii = 100,000
- † Mr. on is 10 times as much as 1 Hundred Thousand 10 x 100,000 = 1,000,000
- 1 Ten Million is 10 times as much as 1 Million 10 x 1,000,000 = 10,000,000
- 1 rundred M $_{\circ}$ on 3 10 times as much as 1 Tan M $_{\circ}$ on 10 x 10,000,000 = 100,000,000
- 1 M1 and is 10 times as thuch as 1 Highered M1 on 10 × 100,000,000 = 1,000,000,000





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Student Page 12



CONNECT (7 min)



Multiplying Ants

Direct students to Lesson 3 CONNECT Multiplying Artis and ask them to complete the learning activity

WRAP-UP (3 min)

Let's Chat About Our Learning

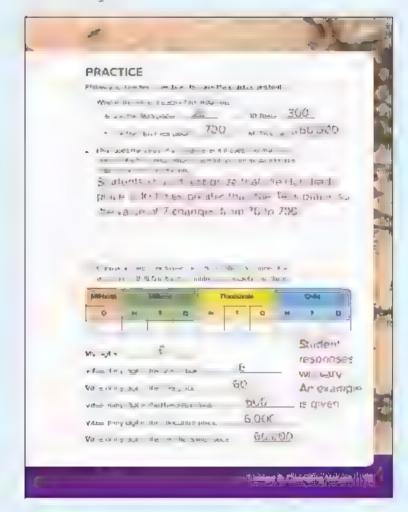
Go over the answers to the CONNECT activity. Multiplying Antiswith students Then, asr volunteers to share their strategies for solving the problems



PRACTICE

Direct students to besson 3 PRACTICE and have them complete the problems. Address student errors and misconceptions around changing values

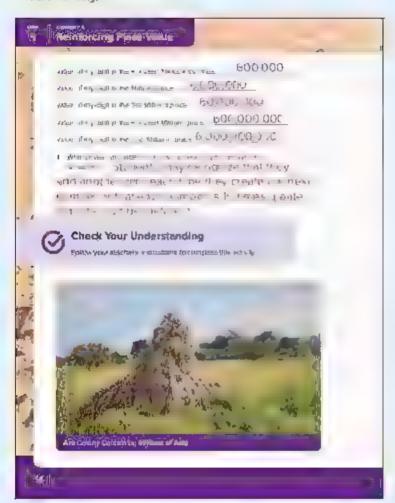
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Student Page 14



Check Your Understanding

- 1. Fit in the blanks below

 One million/1,800,006 is 10 times greater than one
 handred thousand
 - To the year in 2,000 is 10 times greater than two hundred
 - Tevanty to turn or 70,000 is 10 times greater than seven thousand
- 2. What is the value of the following
 - a. 9 in the Tens place? 90
 - b. 3 in the Hundrads place? 300
 - c. 60 Tens? c0P
 - d 80 Thousands? 80 004
- 3 mow does the value of a 3 change as it moves from the Hundleds place to the Thousands place? Use what you know about place value to explain your trinking.
 - The waters of the management of the Them.saves comes else mesignesser the Management pace in the value formanges mean ultitude 101
- 4 Chacse a number between 1 and 9 (Choose a different number than you used in Build) and PRACTICE)

 See Building sample in the
- 5 What pattern (or patterns) do you observe in your answers to Quest on 3?
 5th ments may range, as that they ach another iter. each time they create the next number or that it is number is 10 time. greater than the number call re-.

LESSON 4 Review Comparing Values

Lesson Överview

In this essen, students connect their understanding of place value termultiplicative comparisons. They soldify their understanding that a place value to the left of another is 10 times greater.

Lesson Essential Question

 How does the value of a digit change as it moves one place to the left within a whole number?

Learning Objectives

in this lesson

- Switches will explain the relationship between a given place value and the place value to its left.
- Students will use multiplication to compare place vietés.

Grade-Level Standards

- 4.A.1 Apply and extend understanding effine prace value system to maith-digit whole numbers.
- **4.A.1.a** Demonstrate understanding that in a multi-digit whole number, a digit in one place represents ten times when it represents in the place to its right.
- **4.A.1.b** Expligin place value using numbers to 1,000,000,000,000, including the relative sizes of numbers in each place:
- **4.C.1.a** interpret a multiplication equation as a comparison (for example, $42 \neq 7 \times 6$ as a statement that $42 \approx 7$ times as many as 6)



Vocabulary Check-In

Review vocabulary as needed.



Materials List

- Place Value Chart through the One Willand bace (Display on board)
- Base Temblooks or place value manipulatives
 plus in arge set for the teacher
- Digit Curds 1-9 (1 set per studient) from \$esson 3)
- Large Digiti Cards 1-9 (1) set for the teacher).



Preparation

Protocopy the Brackline Manters for the large Digit cards 1—7 and the Base Fen Manipulatives at the end of this volume. A low time for students to but out the manipulatives or have them do it for homework prior to this lesson. Store manipulatives are for future use

DIGITAL



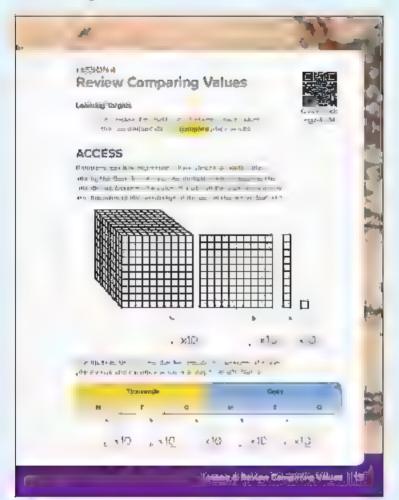
Review Comparing
Values



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PRINT Student Page 15



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

 Students may be able to identify the place values and periods, but may not recognize the pattern or relationallip between each place.

Relationships Are Important!

1. Direct students to Lesson 4 ACCESS Relationships Are important! Make our students understand the directions, then have them begin working. (This earning activity is a review of their learning in Lesson 3.)

2. After about 5 minutes, ask student volunteers to share their answers and explain them their mixing Each minutes in late 15 10 times involved that the countries of the first literature 15 sold with a late 15 sold literature 15 sold literat

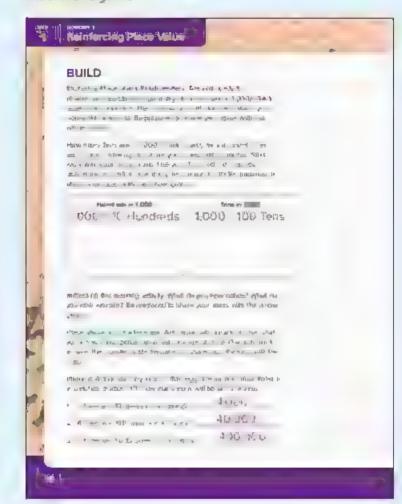
BUILD (40 min)



Exploring Place Value Relationships (15 mms)

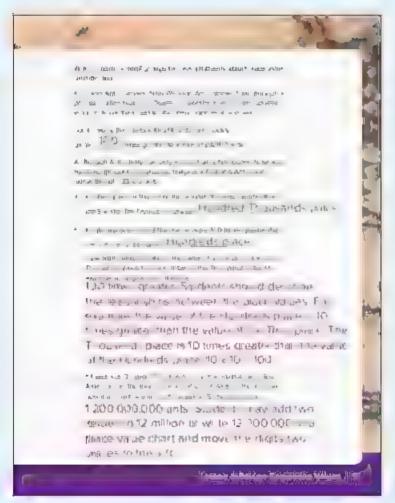
- 1. Remind students that they have a ready reamed that the value of a digit depends on its beative within a number EXP an that they should also know that it can be helpful to understand the relationship between a given place value as and the place value to talleft.
- 2. Ask students to describe the patterns they saw mithe ACCESS problems. Students should device a place to the uplying by 18 cach the atte, move one place to the left.
- Iell students that when we understand these reatment ps we in reistand why waitan write arge numbers will only one digit. Write the summers 555,555 on the board Circle the 5 in the Tens place and draw an arrow to the 5 in the hundreds place. And students to explain the relationship between the values of the two fives. Recording the ning on the board. The value of the 5 in the flens of times greater than the value of the 5 in the Tens of the 1 in the tens of the 5 in the Tens of the Tens of the 5 in the Tens of the Tens of the Tens of the Tens of the
- 4. Explain that there are also important relationarips across place values, even when we cannot see them. Direct students to besson 4 EU LD Exploring Place Value Relationships
- 5. Write the numera. 1,000 on the peard and assistudents now many hundreds are in the numera 1,000 Encourage students to think quety pelore answering, then have them share their thinking with a partner
- 6 Ask volunteers to share their thinking. (At this time, many students will say there are zero municreds in 1,000 because they are focused on a struct reading of the prace value chart.)
- 7. If no students recognize that there are 10 Hundreds in 1,000, have them rount a oud with you as you display and count 10 Hundreds man by atives. Record 1,000 = 18 Hundreds.

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Student Page 17



- 8. Ask students how many Tens are in 1,000. Allow time for them to think and share their answers with a Shoulder Partner. (At this time, some students may recognize that there are 100 fens in 1,000.)
- Playe students work in small groups to combine the transfers rods to create 1,000 and confirm how many
 Jens are in 1,000
- 10. After a few minutes, regroup students and ask them to share their findings. Record 1,000 100 Tens on the poard
- Ask students to consider the numbers they have seen today as they have worked on place value concepts. What do they not se? What do they wonder? Allow time for students to share their tranking. Some students may recognize that they have been working with houltiples of 10. Confirm this thinking. Ask questions to guide students, thinking if they do not mention this.)

Place Value and the Pharaoh Ant (25 mm)

- 1 Direct students to Lesson 4 Bull_D'Place Value and the Pharach Art and ask them to work in pairs to solve Problems 1 3
- Ask volunteers to share their in nung and ask them now these problems relate to what we know about relationships between place values
- 3 maye students work to pairs or small groups to complete Problems 4–7 in Bull D

CONNECT (5 min)



Step to the Left

Have students turn to lesson 4 CONNECT Step to the Left. Go over the directions with students and have them work independently to complete the activity. Which relates to the Essentia Quest on for this lesson.

The share state with the same to a state of the same to a state of the same to a state of the same to a same the same of the s

WRAP-UP (5 min)



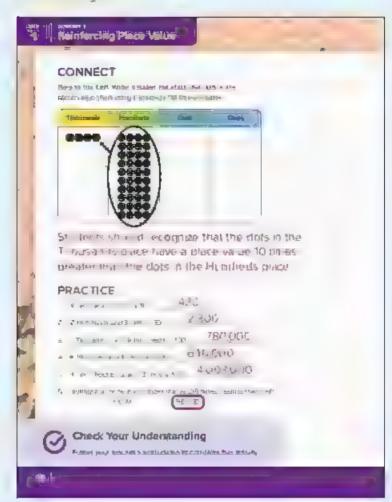
Let's Chat About Our Learning

- I Ask volunteers to share their answers to the Bull and CCNN-ECT problems if time a lows, have students model and explain their thinking for the problems the class found most duallenging
- 2. Ask students to Turn and Tain about how a digit's value changes as it moves to the left on the place value changes as it moves to the left on the place thin ninng. Then ask students to Turn and Tain about what might be a true statement about how the digit's value changes when it moves to the right on the place value changes.

The alies of the draw more sees to the times for the unestable present as time set in the new on the place value. In the

TEAC WER NOTE The concept of Armany 5 The Ar

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PRACTICE

Direct students to Lesson 4 PRACTICE and have them complete the problems. Address student errors and misconceptions

Check Your Understanding

- 2 (5 Thousands and 2 Hundrads) x 100 5, 11000
- 3. (Finundise and Figs) × 1,000 996 or
- 4. \$6 Thousands ≈ 100 E 600.000
- 5 Hight or chole the number that is 1,00 times larger than 42 420 or 4,200
- 6 High ght or citre eithe number that is 1,000 times larger than 123 3 300 or 12,300

1 .tu mct3000 There are un marada m3000

As all said that there are 300 Humdred's in 3,000 Do'you agree or dealgree? Use what you have learned about place value to explain your tribling.

Lesson 4 - Review Comparing Values



LESSON 5 Many Ways to Write

Lesson Overview

In this essen, students write numbers to the One Militard piece in standard, expanded, and wond form by generaling the nowning mbers with number cards. They create the greatest pessible number with given digits and then compare with a partner, abaitizing specific place values with their partner. Finally, students reflect on how with high expanded motation shows the true value of a number.

Lesson Essential Questions

- How can numbers be proxen apart?
- Inpw does breaking numbers apart help us understand them?

Learning Objectives

In this lesson

 Students will write numerals in standard, word, and expanded forms

Grade-Level Standards

- **4.A.1** Apply and extend understanding aftine prace yaide system to multi-digit whole numbers
- 4.C.1 Read and write numbers up to a militard (b., on) waire numerals, word form, and expanded form)
- **4.A.1.a** Demonstrate understanding that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right
- **4.A.1.b** Expire place value using numbers to 1,000,000,000, including the relative sizes of numbers in each place



expanded form, standard form, word form



Materials List

Digit Cards 0-9 (It per student) (from
Lesson 2)

DIGITAL



Lesson 5

Many Ways to Write

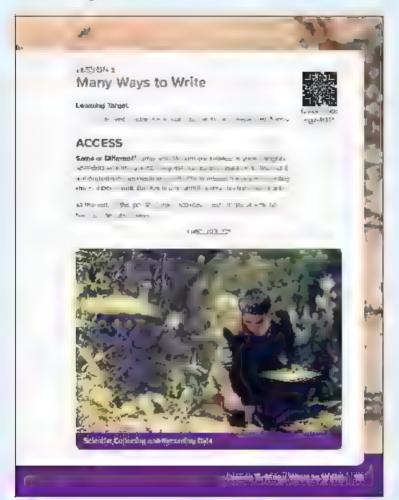


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12



PRINT Student Page 19



ACCESS (10 min)

COMMON MISCONCEPTIONS AND ERRORS

- Students may be confused about newter petresent a place value with a 0 digital expanded form. For example 30,456 30,000 +400 +50 ± 4. The 0 sinoi represented in expanded form because it standard form the 0 represents that there almost ing in that place value.
- Students may struggle to say large numbers and need to be rethinded to group the numbers infoperiods as they read them aloud.
- Students may larget to use commas when writing puritiers in word form.

Same or Different?

- Direct students to Lesson 5 ACCESS Same or Different: Ask students to read the scenario independently
- 2 Ask a volunteer to read the number of arts Omar counted. Ask another volunteer to read the number of arts Manara counted.
- 3 mave students explain to their Shoulder Partner whether they think Omer and Mariam counted the same number of ents or a different number and explain to their partner how they know.

 Omer and Mariam counted the same number of their order order
- Ask valunteers to share their thinking with the whole group. Ask follow-up questions, such as the following



- How do you know?
- Is there a way to be sure they are the same (or different)?
- What is the same about these numbers?
- What is different?

BUILD (40 min)



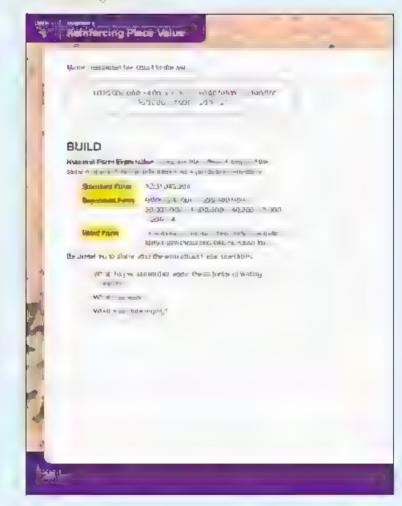
Numeral Form Exploration (10 min)

- 1. Direct students to Lesson 5 BUILD Numeral Form. Exploration section of their Student Materials. Show students the number 9,231,043,204 written in standard form, expanded form, and word form Read the numbers aloud with students.
- 2 Ask students to share their thinking about the following questions:



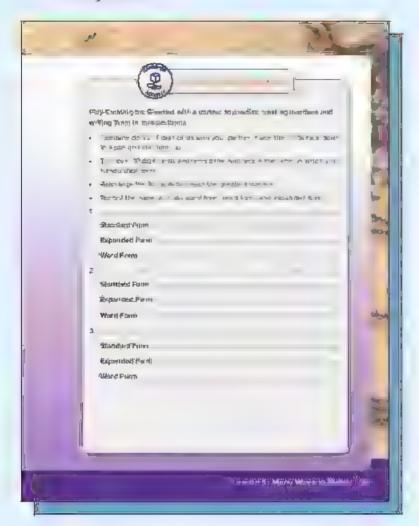
- What do you remember about these forms of writing numerals?
- What was easy?
- What was challenging?
- Expantnation mathematics, we use the standard form most often incrobers are also frequently written in word form Expanded form he palus recognize that digits are placeholders representing the Ones, Tens, Hundreds, Thousands, Ten Thousands, Hundred Thousands, are so on Numbers written in expanded form show their follows.
- A. Point to the Os in the Hundred Phousands and Tens places. Ask students how these are represented in expanded notation. Explain that aeroes are not needed in expanded notation because there is nothing in that place value if students struggle with the concept, write several examples of this in standard form and expanded form on the board.
- Figure to the commas in standard form and note that they are also used in ward form to separate the Mill ard, Millions, Thousands, and Ones pends

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Student Pages 21 22



Creating the Greatest (30 mm)

- Direct students to Lesson 5 build Creating the Greatest. Go over the directions for Creating the Greatest together Model game play if necessary Students will need their digit cards 0-9 to play
- 2 Give students about 20 minutes to play the game with their Shoulder Partner. As students work, walk around and monitor their game play to make sure they are following the directions. Offer support as needed.

3 After 20 minutes, ask students to commute their greatest numeral with that of their Shoulder Partner Ask student pairs the following questions



- Which of you has the greatest numeral?
- Which of you has the greatest digit in the Jen Thousands place?
- Which of you has the smallest digit in the One Milliards place?
- Which of you has the smallest digit in the Ien Thousands place?
- 4. Ask students to share their strategies for writing large numbers in a flerent forms

CONNECT (7 min)



Writing About Math

Direct students to assent CONNECT Writing About Main and ask them to aspond to the prompt.

Students should have used place value and an incential for the value for example it who to compete the incential for the value for example it who to compete the incential formula for example it who to compete the incential formula for

WRAP-UP (3 min)



Let's Chat About Our Learning

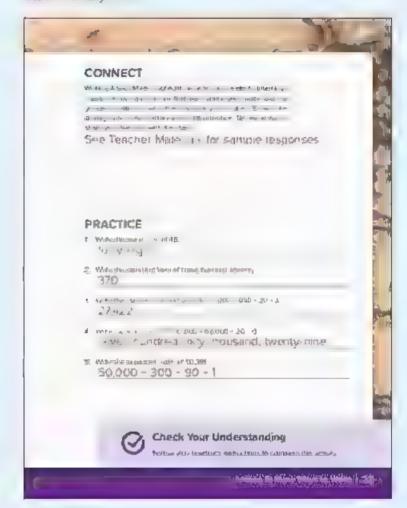
- Ask a few student volunteers to share their Whiting.
 About Math entiries
- 2 Ask students to expain now writing numbers in expanded form can help them understand really big numbers. Encourage students to use mathematical language in their expands ons.

 12) Parts insultanote trace appared form responded fo

PRACTICE

Direct students to Lesson 5 PRACT, CE and have them complete the problems. Address student emors and misconceptions around the many ways to write numbers.

PRINT







Check Your Understanding

Complete the table below

	Standard Form	Expanded Form	Word Form
1	565	00 # 60 # B	hve manaked sudy-11.4
↑	4 **)	4 GNO ← 70C → €	four thousand, seven hundred
3	2,345,222,197	10	rw or ar two-pumbed for, two main two banded two 1, two thousand me a sedicity/seven
4		ო ი. ი ბით +-≇იც იით,300 + პ 900 000 + 7,000 000 + -ი. ეე+ 90 ებნ + 5 100 + 4 + -	e gnt mill and four hundred twenty-seven million, nine "hundred ninety-five thousand, forty-hine
5	r - 3r 7 7 4	6,000,000,000;++ 400,000,000 + 30,000,000 +-6,000,000 + 20,000 + 3,000 +-500 + 4	the day to be take of the



LESSON 6 Composing and Decomposing

Lesson Overview

in this essen, students practice reading large numbers. and then work to understand the terms compose and decempose. They compet composing and decomposing numbers to the work they did in Lesson 5 as they decompose numeras using a combination of expanded form and multiplicative representations of place value

Lesson Essential Questions

- How can numbers be proxen apart?
- How does breaking numbers aparthelp us anderstand them?

Learning Objectives

in this lesson

Students will compose and decompose-numerals in multipe forms

Grade-Level Standards

- 4.A.1 Apply and extend understanding of the place value system to me til-d'oit whole numbers
- 4.C.1 Read and write numbers up to a miliard (b., on) using numerals, Word form, and expanded form
- 4.A.1.a Demoristrate understanding that in a mett-digit whole rumber, a digit in one place represents ten times what it represents in the place to its nght
- 4.A.1.b Expira niplace value using numbers to 1,000,000,000, including the relative sizes of numbers in each place



Vocabulary Check-In

compase, decampose, decomposed form, expanded form, standard form, word form



Materials List

- Place Value Chart through the One Milland prace (Dispray on board)
- We life Who Has? Cards (1 set) and Antwer Key forthe teachers



Preparation

Priotocopy the Binorline Marten at the end of triis volume

DIGITAL



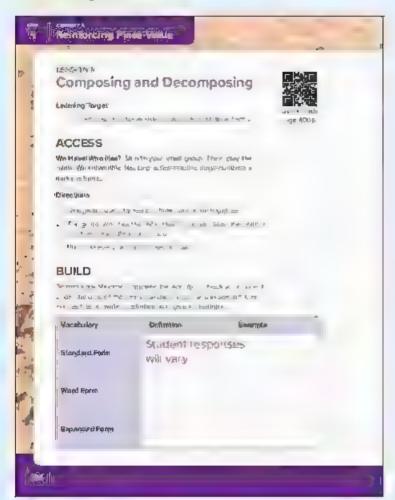
Composing and **Decomposing**



egr##4006



Student Page 24



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may not be sure how to represent a zero
 in a place which the islumber is decomposed.
- Students may incorrectly use parentheses to group place values.
- Students may not connect eights in their place values, expanded notation, and decomposing numbers
- Studients thay confuse the terms compose and decompose

We Have/Who Has?

- 5 Divide students into 16 small groups. Distribute one We have/Who Has? card to each group.
- 2. Play the game as a warm-up and a review of learning in Lesson 5

We Have/Who Has? Directions

- The group that has the card with the star starts by reading their card aloud registrer.
- The group who has the "Who Has?" number raises their hands and then reads their card aloud
- Play until every group has used its card

BUILD (40 min)



Terminology Review (10 mm)

- Direct students to Lesson is Build Terminology
 Review. Ask them to write definitions and give
 examples for standard form, expanded form and
 word form.
- 2 Go over the glossary definitions as a class and have students add any necessary revisions.

Composing and Decomposing (2 min)

I Ask students to talk to their Shoulder Partner and predict what mught happen to an airth lafter a strong wind or rain storm.

1 Reinforcing Place Value

 Direct students to Lesson 6 Bull_D Composing and Departposing. Ask students to look at the images of the anth is and briefly describe their observations

Composing 145 (8 mm)

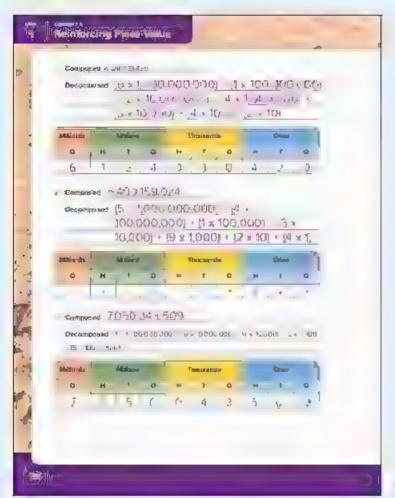
- 3 Explain that numbers, like an anthil," can be composed (protein and decomposed (protein apart). Ask students to work independently to complete the activity Composing 145 in their Student Materials. Encourage students to use a variety of operations as they compose 145.
- 4. After a few in nuites, tell students to share with a Shoulder Partner some of the ways they composed 145. And was a will vary out students' correposition nethrous about diequal 145.
- 5. Show students the place value chartion the board Ask students to share ways that the chart might help them decompose numbers (Students may say that a place value chart helps them more easily see how to write numbers in expanded notation.)
- Write or display the following rumbers on the board:
 60,000 + 7,000 + 800 + 90 + 1
 (6 × 10,000) + Ø × 1,000) + (8 × 100) + (9 × 10) + (1 × 1)
- Ask students to exact the numbers on the board and task to the influence Partner about whether they represent the same numeral or different numerals
 - They inhibite serve कार डाक्ट गंपाकित व
- 6 Tell students that this strategy for decomposing numbers combines expanded form and multiplying by multiples of 10, which they earned about in Lesson 4. They can think of it as decomposed form

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Student Page 26



Composing and Decomposing Numbers

- Ask students to work independently to complete the problems in Build Composing and Decemposing Numbers if the whole class is strugging, work with the whole group to so we the problems, modeing your thinking by doing a Think Aloud Guide students' thanking by asking questions that help there consider next steps. If some students are able to work with a small group of students to support their earning
 - 1 Decomposed a x 1 10 pt x + x 110 000 40 + 0 x 10 10 ftc + + x 1 1 f x + + 5 < 00 + .+ x 0x + .2 x 1 n
 - 2 Decomposed (5 × 1 f f (())((+ ,1 × 100 f () ,000) + (5 × 10,000) + (9 × 1,300) + (2 × 10) + (4 × 1)
 - 3 Composed 7,050 04 FC1
 - A Anyware wo and alternational transmitted to the standard for the standar

Leason 6 • Composing and Decomposing

CONCEPT Reinforcing Place Value

CONNECT (7 min)



Writing About Math

Direct students to lesson & CONNECT Writing About Math and ask them to respond to the prompt

TEACHER NO. E. Consider collecting and reviewing terror of the mornage, TO TOWN E WIT appropriate insplantment stars

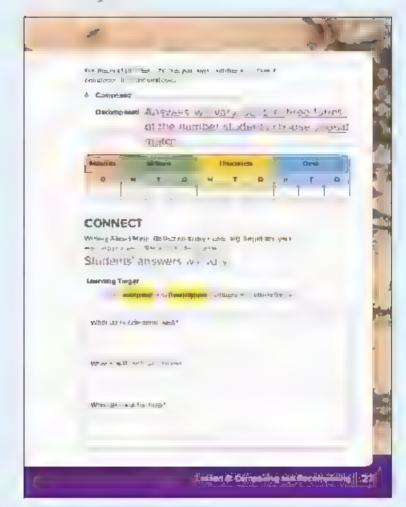
WRAP-UP (3 min)



(P) Let's Chat About Our Learning

Ask students to expend the strategies they used to complete the BU .D problems. Encourage students to help each other correct errors and discuss strategies that worked for them.

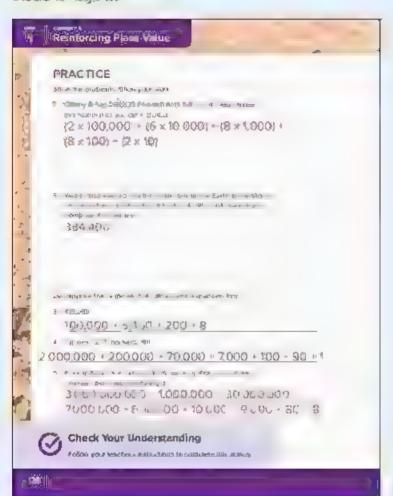
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Student Page 28



PRACTICE

Direct students to Lesson 6 PRACTICE and have them complete the problems. Address still dentemors and this conceptions around composing and decomposing multipless.

Check Your Understanding

Decompose the numeral below using expanded form

1 67 million, 38 theusand, 12 60 000,000 + 7,000,000 + 30,000 + 8 030 # 10 + 2

Decompose the numerals below as you did in BU ID

- nine mili on, four hundred forty thousand, two hundred twenty
 1,000 000) + (4 × 100,000) + (4 × 10,000 + 4 × 10,000 + 10,000)
- 3. six full[ard, a ne han dred if high, ten thousand four (b \times 1,000 000,000) + (7 \times 100 000 300) + (1 \times 10 000) + (4 \times 1)
- 4. e.ght m l.on, seventy thousand, two hundred x 1 000 0001 + (7 x 10,000) + (2 x 100)
- 5 twenty-seven handred _ x 1 k* (+ 1/2 x 10%)



Concept Check-In and Remediation

Lesson Overview

inithis lesson, students work to correct misconceptions and arrors from Concept 1. Reinforcing Place Value First, administer the Concept Check-Ini. Once you have reviewed the quiz results, thoose remediation activities based on the needs of your students. Some recommendations are isted below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or in a small group with the teacher.

Concept Essential Questions

- jhow can live mathematica, vocabulary to build understanding of place value?
- How-does the value of a digit change as it moves in a whole (temper)
- mow does the value of a digit change as it moves one place to the left within a whole illumber?
- "how çan mumbers be stoken apart?
- "how goes breaking humbers apart help us understand them?

Learning Objectives

in this lesson

 Students will work to correct misconceptions and errors related to place value.

Grade-Level Standards

- 4.A.1 Apply and extend understanding of the place value system to multi-digit whose numbers
- **4.A.1.a** Demonstrate understanding that in a multi-digit whose number, a digit in one place represents ten times what it represents in the place to its right

Materials List

Materials may vary

DIGITAL



Concept Check-In and Remediation



QL or Code egmt4007



- 4.A.1.b Explain place value using numbers to 1,000,000,000, including the relative sizes of nurrisers in each place
- 4.C.1 Read and write numbers up to a mulard (button) using numerals, world form, and ejirpar degi folimi.
- **4.C.1.a** Interpret a right triplication equation as a correpar son (for example $42 = 7 \times 6$ as a statement that 42 is 7 times as illiany as 6)



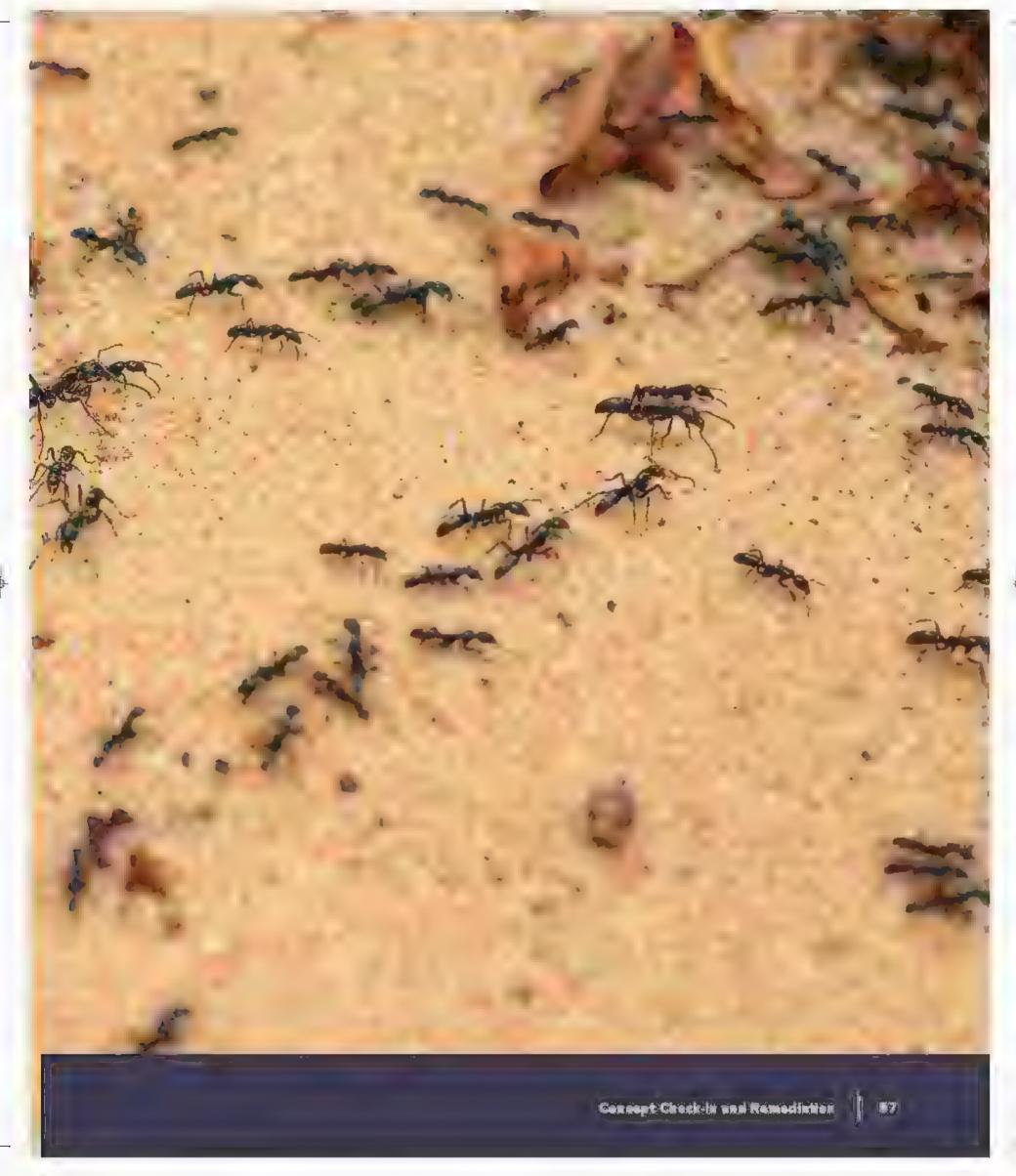
Vocabulary Check-In

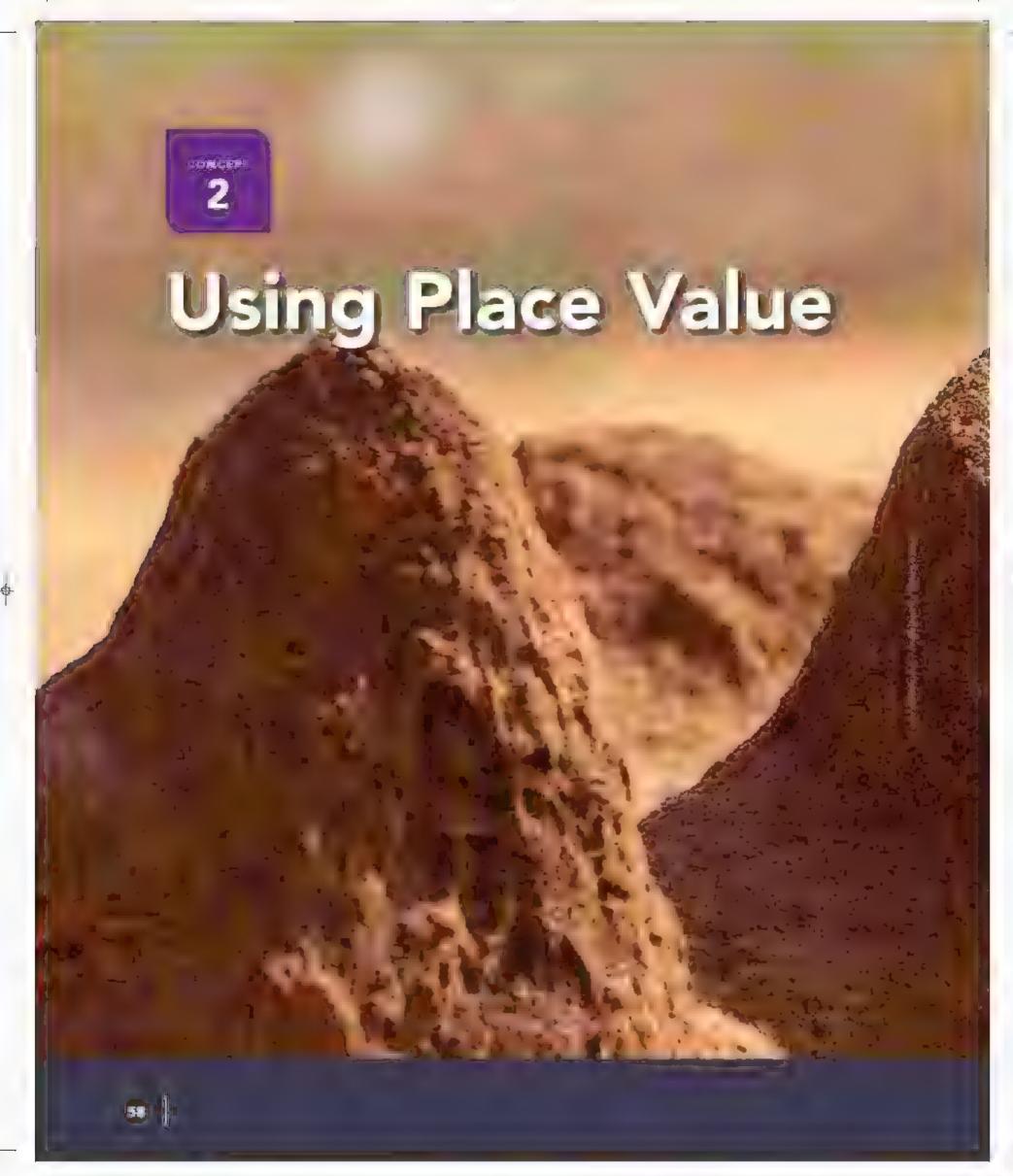
Raview concept vocabulary as needed

COMMON MISCONCEPTIONS AND ERRORS

- "Students may not understand that the position of a digit in a numeral determines its
- Students may struggle to read arge numbers correctly utilizing Ones. Thousands, Millions, and Milliards.
- Students may be able to identify the place values and periods but may not recognize the pattern or residenship between each place.
- Students may be confused about how to represent a place value with a D digit in expanded form.
- Students may struggle to say large numbers and need to ke reminded to group the numbers into periods as they lead them aloud.
- Students may not be sure how to represent a zero in a place when the number .
- Students may not connect digits in themplace values, expanded notation, and decomposing numbers

Concept Check-in and Remediation





Concept Overview In Concept 2: wsing Place Value, students apply what they have learned about place value to compare and order very large numbers. Studerits build understanding of The importance of place value in reading, writing, and understanding numerals to the One Milliard prace and in estimating. Students review the purpose of estimation and practice two strategies—front and estimation and muniting using place value—and gletermine which strategy provides the most accurate estimates. These place value cente pts help students master more and enging concepts in Parmary 4, including multip cation, division, fractions, and decimals Concept Standards 4.A.1.c Read and write numbers up to a miliferd (billion) using numerals, word form, and expanded form 4.A.1.d Use place value understanding to round multi-digit whole numbers up to the m lards (b) lons) place 4.A.1.e Order a set of numbers up to the Malard place 4.A.1.f Compare two multi-digit numbers using the sympols < > to express the relationship 4.C.1.e Assess the reasonableness of answers using mental complitation and estimation strategies including rounding

Concept 2 Using Place Value

Concept Planner

All lessons are designed to be 60 minutes. The materials listed in this chart are items to gather for each group. Items for the class or for individual students are indicated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
7 Review Gompar ng Really Big Numbers	Digit Cards 1-9 (1 set per student) (From Lesson 2). Comparison Symbols (Found at the end of this yours)	Compare Efficient Equality	Students will use place value to compare large numerals.
		Error analysis Greater than Less than	 Students w use symbols to express numerical compatisons
8 Samparing Numbers In Multiple Farms	Chart paper Markers Digit Cards 0-2 (1 set per student) (from Lesson 2)	Decomposed form Efficient Expanded form Stahdard form Word form	 Students will compare numbers in multiple forms Students will describe strategres for comparing numbers in multiple forms



Common Misconceptions and Errors



Opportunities for Formative Assessment

- Students sometimes compare the number of digits in a numeral rather than the value of the largest digit.
- Students sometimes forget to consider how many digits are in a numeral when they compare

Comparing Ant Hills, Using Greater Than and Less Than to Compare, Writing About Math, Practice, Gheck Your anderstanding

- Students may struggle with comparing numbers in word form or expanded notation
- Students may struggle with find high system that he pe them compare numbers in different forms.

Strategies for Comparison, Yumber Battle, Writing About Main, Practice, Check Your understanding

Concept 2 Using Place Value

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
Pescending and Astending Numbers	Set of 5 large notecards or sneets of paper, each with 1 mumber written on n. - 78,090 - 79,010 - 78,091 - 79,100 - 78,999 Set of 4 arge notecards or sheets of paper, each with 1 number written on it: - three m, rand, ten in! en, one thousand, th rity-four - three m, land, one millian, three hundred inneity-one - three milliand, nine hundred purety two - three m land, one hundred on neity two - three m land, one hundred ten million, ninety two	Ascending Compare Decomposed form Descending Expanded form Order Standard form World form	Students will order numbers in multiple forms Students will describe strategies for ordering numbers in multiple forms
10 Predicting the Unpredictable	• No ada tipnal materials needed	Est mation Front-end est mation Reasonable	 Students w explain front-end estimation Students will use front-end estimation to approximate arge numbers
11 Republing Rules	 Two sets of Large Digit Cards 0-9 (For the teacher) Rounding Rule on chart paper Circle the digit, look next door 5 or higher? Add one more 4 or less? Let it rest 	Accurate Estimation Nearest Reasonable Rounding	 Students will apply multiple strategies to round numbers Students will discuss whether rounding or front endiest mation provide a more accurate est mate



- Students may not understand the place value relationships between the standard, word, and expanded forms of a number
- Students may not understand that numbers can be ordered to must ple forms (standard, word, or expanded form)
- Students may struggle to compare and order numbers
 with similar digits and need to be raminded to startion the
 left and compare each digit while moving to the right of a
 number



Opportunities for Formative Assessment

Ascending and Descending Numbers, Writing About Math, Practice, Check Your Understanding

- Students may struggle with knowing when to estimate and when an exact number is needed to so ve a problem
- Students may confuse front and estimation with other rounding aretagies
- Students may not understand the value of determining the reasonableness of answers

Exact or Not?, Front Etid Estimation witing About Math, Vocabulary Builder, Practice, Check Your Understanding

- Students may Misapply the nulle for rounding down and actually lower the value of the digit in the designated place instead of keeping at the same or increasing it by one
- Students may misapply the rule for rounding up and change the digit in the designated place, while not changing digits in smaller places to zeroes
- Students often only use front-end estimation for determining the reasonableness of answers. Rounding provides more accurate estimates.

Rounding using the Midpoint Strategy.
Rounding Rule, Which Strategy is
Best?, Place Value and Rounding
Practice, Check Your Understanding

Concept 2 Using Place Value



-	JP80		
-	135	_	
	100		

Concept Check-iff Meter als will vary Review vocabulary terms as record. * Students will work to correct presented. presented. to comparing. ordering, and nounding numbers	Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
		Materals will vary	vocabuary ierris as	work to tarrect Entropy and to comparing, ordering, and

Opportunities for Assessment:

in addition to the assessment opportunities induced in this chart, each concept will include a Concept Check-in.



Common Misconceptions and Errors



Opportunities for Formative Assessment

- Students do not often consider hely many digits are in a numeral when they compare
- Students may struggle with companing numbers in word form or expanded notation.
- Students may struggle with finding a system that neps them compare numbers in different forms
- Students may not understand the place value relationships between the standard, word, and expanded forms of a number
- Students may struggle to compare and order numbers
 with similar digits and need to be reminded to start on the
 left and compare each digit while moving to the right of a
 number
- Students may struggle with knowing when to estimate and when americal humber is needed to solve a problem
- Students may misapply the rule for rounding down and actually lower the value of the digit in the designated place instead of keeping it the same or increasing it by one
- Students may misapply the rule for rounding up and change the digit in the designated place, while not changing digits in smaller places to zeroes

Consepti Check with

Concept 2 Using Place Value

LESSON 7 Review Comparing Really Big Numbers

Lesson Overview

in this lesson, students use their growing understanding of place value to the ld, read, and compare very large mambers. They review and use the mathematica symples we use to compare numbers, using place value to be place make accurate and efficient comparisons.

Lesson Essential Question

How can we afficiently compare very large numbers?

Learning Objectives

in this lesson

- Students will use place value to compare large numerals.
- Students will use symbols to express numerical configures;

Grade-Level Standards

- **4.A.1.c** Read and write numbers up to a mill and (bit on) using numerals, word form, and expanded form
- 4.A.1.d Use place value understanding to round mutu-digit whose numbers up to the mill ands (b) place
- **4.A.1.f** Compare two multi-digit numbers using the symbols <, >, = to express the relationship.



Vocabulary Check-In

compare, efficient, equal to, error analysis, greater than, less than



Materials List

- Digit Cards I = 4 (I set per student from Lesson 2)
- Comparagn Symbols



Preparation

Photocopy the Black he Master of Companison Symbols anthe end of this volume.

DIGITAL

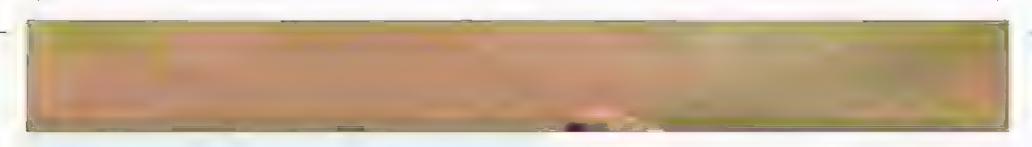


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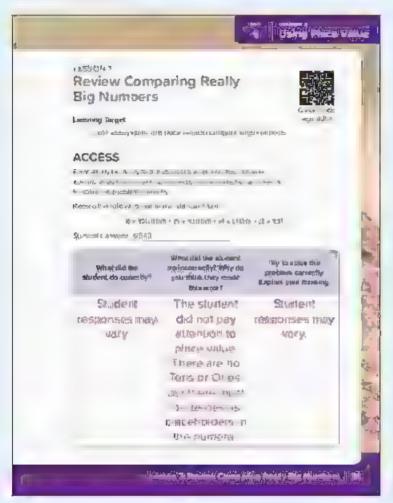
Review Comparing Really Big Numbers



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Student Page 31



ACCESS (10 min)



The Control of the Co

- Students sometimes compare the number of dig #s in anumera mither than the value of the largest digit
- Students sometimes forget to consider how many digits are in a numbers, where they complete.

Error Analysis

- Ask students to furnite Lesson 7 ACCESS Error Analysis
- 2 Explain to students that it is problem is an enter analysis problem. Remind students that they solved errors are yes problems in Primary 3. When enalyzing errors, they must figure out what the student is the problem of right, what they did wrong, and correct the mistakes. This will help them analyze and correct errors in their own work, which helps them become better thinkers and methematicians.
- 3. Ask students to complete the error and yes proplem After about 7 infinites (or sooner if students are done), ask voluitieers to share what they noticed and how they confected the student's error.

 The student that a receiver any or the other or the area are made on the number of the remediate of the students.

Lesson 7 - Review Comparing Really Big Numbers



BUILD (40 min)

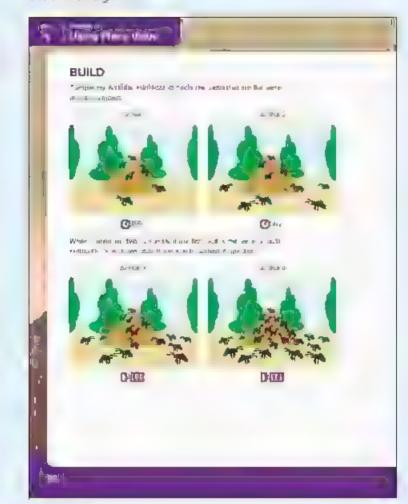


Comparing Anthills (15 16

- 1. Direct students to Lesson 7 BUILD Compating Anth. Is, Use Calling 5 clasto select students to read reach number under Anth. is 1 and 2 a bud
- Ask students to highlight or circle the digits that are the same in both numbers (4)
- 3 Ask students to identify the digits place value income. Thousands place) and now much that digits worth a each interest (4,000)
- 4. Ask students to talk to a partner-to answer the following quest on When comparing two numerals, fittle first digit is the same in both numerals, how do we determine which numeral is greater?
- Ask volunteers to share their ideas. Ensure that students understand that they must first make sure the two numbers have the same number of digits and PHEN compare the next value of the digit in the next place to the night.
- 6. Repeat steps 1 5 with Anthills 3 and 4
- 7 Ask studients to discuss how they can use place value helps to compare really big numbers

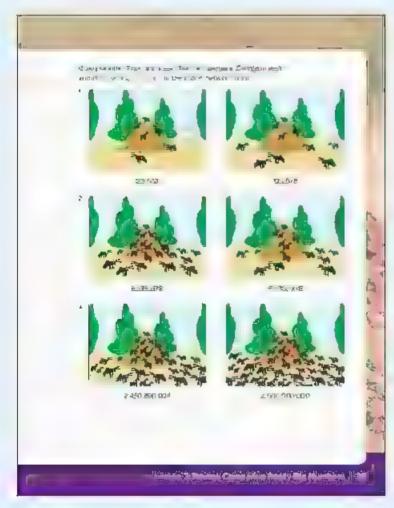
The first the table is connect the artist of the first highest with the feature of the major the plant the first highest with the feature of the major the plant to the second as needed for example with Ant Hims I and a second could not be first that each quoteral that the same diction the limits that each quoteral that the same diction the limits and place, but Annual 3 has a x 1.000 in the limits and a place.

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Student Page 33



Using Greater Than and Less Than to Compare, Write an Explanation (25 mm)

- Write the two numerals from Anth is 1 and 2 from Comparing Anth, is on the beard liveave enough space between the numbers to add a comparison sigh. Ask students to read the numerals aloud again.
- Display the cards < >, and and ask students to explay what each symbol means and how they use them to compare numbers
- 3. Use Calling Sticks to select a student to come to the front and tape the appropriate symbol between the two numbers. Ask the student to explain their thinking. Explain to students that the strategies they use should be efficient—in other words, they help their solve problems quickly and accurately. For example, they could compare two numbers using Base Ten placks and get the correct answer, but that strategy would take allong time and would not be efficient.

- 4. Repeat the procedure again, first using the numerals 95,000 and 950,000 and then using the numerals 25,411,239 and 24,411,293. Be sure to have students chorally read the numerals about percent companing them. As students work, remicirce the importance of using what they know about place value to compare the large numerals.
- 5. Direct students to Lesson / BuiLD Using Greater
 Than and Less Than to Compare and work in pairs
 or small groups to complete the earning act liftles
 using Greater Than and Less Than to Compare
 and Write an Explanation When there are about 5
 minutes left in BUILD, go over the answer together

CONNECT (5 min)



Writing About Math

Direct students to lesson 7 COMNECT Winting About.

Main and ask them to respond to the prompt

The first of the first students of the prompt of the prompt

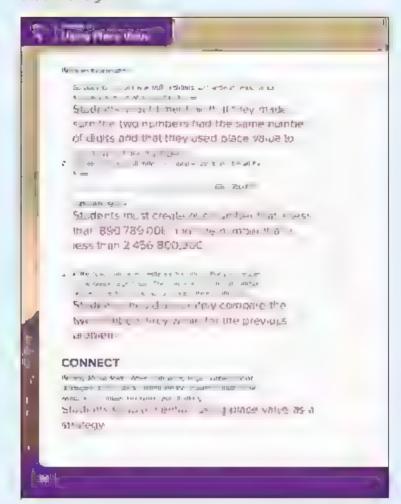
WRAP-UP (5 min)

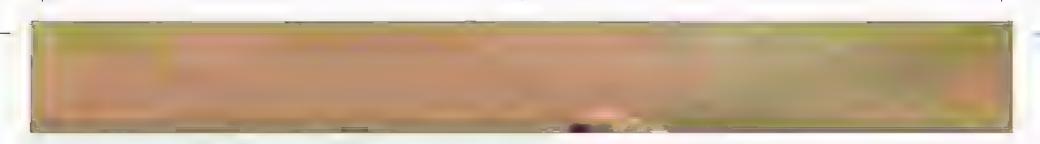


Let's Chat About Our Learning

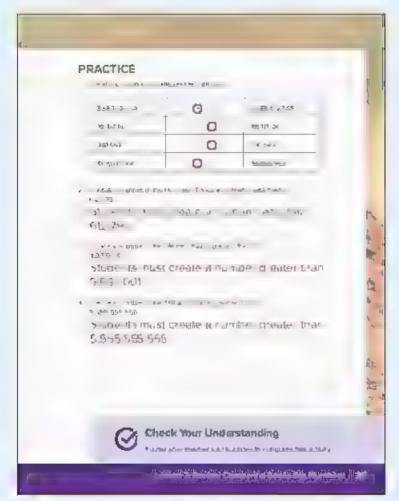
- Ask students to share their ideas from CONNECT finecessary, guide students to share how they can use place value—and the value of the digits within a number to compare large numbers
- 2 Ask students to think about the following questions: Why, is it important for us to be able to compare numbers? When might we need to compare numbers outside of school?
- 3. Ask students to Turn and Tair, to share their deas with a patine
- 4. Lee Calling Striks to salest 2-3 students to share their thinking. Encourage students to use real world connections to explain the importance of being able to compare numbers.

PRINT





Student Page 35



PRACTICE

Direct students to Lesson FPRACTICE and have them complete the problems. Address studential or and miscenceptions

Check Your Understanding

1. Circle the symbol to compare the numbers

1,231,425,234	<	1,321,454,435
67,353,622	<	67,353,630
40,243,021	>	40,209,314
999,999,990	<	1,000,000,000

- 2 Create a number in the Hundred Thousands that is essithan (<) 893,824
 - Studients must create a number less than 893,924
- Greate a number in the Tep.M. kons that is greater than (>) 34,450,600,125
 - Studients thrust disase a multiplied & mater than all 450 mg /
- 4 Create a number in the M. lands that is greater than .-) 3,456,789,000
 - The verte must preste a humbler wester war a ser in a r

Lesson 7 - Review Comparing Really Big Numbers



LESSON 8 Comparing Numbers in Multiple **Forms**

Lesson Overview

mithis lesson, students combine the run derstanding of writing numbers in afferent forms with the previous lesson of comparing numbers. They compare numbers in a combination of forms (standard written, expanded). decomposed). They create their own strategies to help them compare

Lesson Essential Question

new car we efficiently compare very large pulmoers?

Learning Objectives

in this lesson

- Students will compare numbers in multiple forms
- Students will, describe strategies for comparing numbers in multiple forms

Grade-Level Standards

- 4.A.1.c Read and write numbers up to a m. and (b I on) using numerals, word form, and expanded form
- 4.A.1.d Use place yalue understanding tairbund mutu-digit whose numbers up to the impards (b) sheet prace
- 4.A.1.f Compare two multi-digit numbers Jamo the symbols <, >, = to express the relationship.



Vocabulary Check-in

decomposed form, efficient, expanded form, steridard form, word form



Materials List

- Chart bacer
- Markers
- Digni Cards 0-9 (it set per studient) from wesser 2)

DIGITAL





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Student Page 36



ACCESS (10 min)

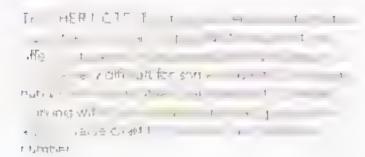


COMMON MISCONCEPTIONS AND ERRORS

- Students may struggle with comparing numbers in world form or expanded notation
- Students may struggle with inding a system that helps thermoonpase numbers in different forms.

Comparing Anthill Populations

- f. Remind students that in their last math lesson, they worked to compare numbers in standard form. They tried to find and use strategies that he ped them efficiently compare numbers—strategies that he ped them efficiently compare numbers—strategies that enabled them to work quickly and find the correct answer. Today they will take on a greater that lenge by comparing numbers if multiple forms.
- 2. Ask students to faith to Lesson-8 ACCESS
 Comparing Anthil, Populations. Explain that these humbers are written in word and expanded forms.
 Ask students to word with a Shoulder Partner to compare the numbers using greater than, less than, at equal to symbols.
- 3 After a few in nules, ask student volunteers to share the strategies they used, particularly for the last problem where they compared two different forms. (Some students may have converted them to standard form, while others may have used the place value indicated in the word or expanded form.)



Laszon B . Comparing Numbers in Multiple Forms



BUILD (40 min)

jeř to



Strategies for Comparison (25 mm)

- 1 n _esson & stadents defined three forms of numbers (standard, word, and expanded). In Lesson & students decomposed numbers and wrote them in decomposed form. Direct students to Lesson & Build Strategies for Companson and ask them to review decomposed form.
- 2 Ask students to work with their Shoulder Partner to preate and record a definition for decomposed form.
- 3 Ask partners to share their definitions with the crass use students definitions to create a class definition in their Student Materials

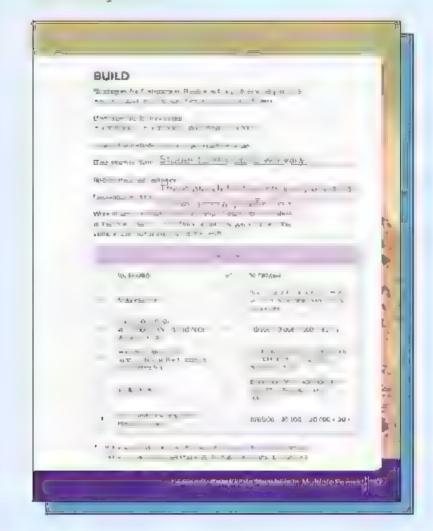
 It, with left the may lary, but the class of the class of the class definition in their student Materials.
- As a class, create an archor chart called "Strategres for Comparing Really align numbers" First, as a students to tall to their Show der Partner about the strategies they used in the previous lesson when comparing numbers in standard form. Then, have students share their strategies and record them on the class anchor chart. Model if needed (Possible strategies students may name not decording the number of digits first to see which has more, comparing the first digit to see which has more, comparing the first digit to see which has to get; and comparing the second digit if the first digit is the
- 5 Te I students that today they will compare numbers in the tipe forms and will continue adding to the cass anchor chart

same in Both numbers)

- b Have students return to \$1. Dand work in pairs or small groups to complete Problems 1-7. After about 5 minutes, ask students to share their answers and explain their strategies
- Ask students if they have any new strategies to add to the anchor chart, particularly for comparing numbers in multiple forms. (Possible strategies students may name change one number so that they are in the same form, change both numbers so they are in standard form; and look at the highest place value.)

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Student Pages 37-38



Number Battle (15 m m)

1. Tell, students that today they will play Number Battle with two other students to practice building, reading, and comparing numbers. Ask two volunteers to come to the front of the from to play one round with you to model the process.

Number Battle Directions

- The game requires 3 players 2 players are "builders" and 1 player withe "reader."
- Each prayer needs a set of draft parcs 6-9
 - 1. Players will combine the 3 decks (30 cards), shuffle the cards, and place them face down in the middle.
 - 2 Each builder draws 11 cards
 - 3 Each builder uses 10 of the ricards to create the greatest number possible and discards the 11th card
 - 4 The reader will read each builder's number about
 - 5. The builders write their number and their partier's number in the table in their Student Materials. Be sure to pay attention to how the numbers should be recorded for each round.
 - & The builders compare their numbers and record the appropriate sign (< or >)
 - The bur dess discuss. Which place value did you use to determine which number was greater?
 - 8 Rotate tores and play again
- 2 Create small groups of 3 Have groups play for the remainder of § J., D. Remind students to totate roles after each found.
- 3. Fell students that when they have finished comparing four rounds of the game, they should circle their greatest number and draw albox around their smallest number.

Laszon B . Comparing Numbers in Multiple Forms

CONNECT (7 min)



Writing About Math

Direct students to lesson 8 CONNECT Writing About Math and ask them to respond to the prompt

EACHERMO E C der contecting a lieview is that is Within the part Mathematic in the profes how we they wriderstand compared list as himphere in e forms. The internation may be a second mounts for full use assorbe and the P 3 4

WRAP-UP (3 min)

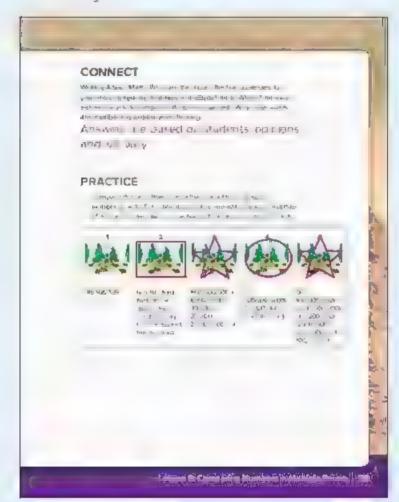


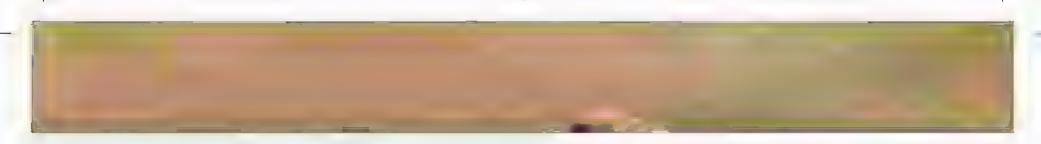
Numbers in the Real World

Ask students to discuss when they might need to compare numbers in different forms in the real world What strategies have they learned to help them do

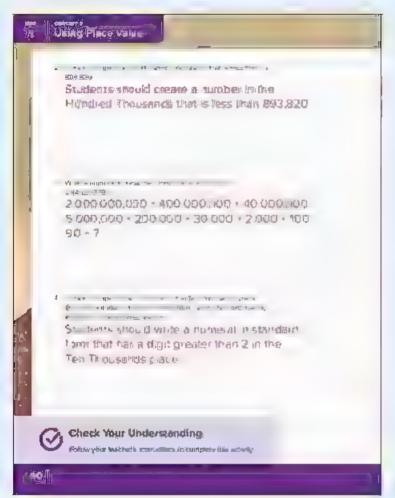
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Student Page 40

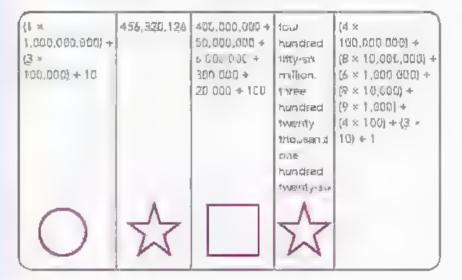


PRACTICE

Direct students to Lesson 8 PRACTICE and have them complete the problems. Address studential rors and misconceptions

Check Your Understanding

1 Compare these arithms. Circle the one with the greatest number of arits. Put a bex around the one with the least number of arits and draw stars on the two with an equal number of arits.



Laszon B . Comparing Numbers in Multiple Forms



LESSON 9 Descending and Ascending Numbers

Lesson Overview

mithis lesson, students ander very large numbers in multiple forms and apply the terms ascending and descending to their math vocabulary

Lesson Essential Question

 How can understanding place value help us order. very large (wimbers?

Learning Objectives

in this lesson

- Students will grown numbers in multiple forms
- Students will describe strategies for ordering numbers in multiple forms

Grade-Level Standards

4.A.1. Order a set of numbers up to the Willard p ace

4.A.1.1 Compare two multi-digit numbers using the symbolis < , > in to express the relationish p



Vocabulary Check-In

ascending, compare, decomposed form, descending, expanded form, order, standard formy word fame



Materials List

Set of 5 large notecards of theets of paper, each With one number written on it

- 78,090
- 79,100
- 79,010
- · #8,999
- 78,691

Set of 4 large motecards or sheets of paper, each with one number writish on to

- three milliard, ten roll lon, one thousand. thristy-four
- three militard, one militing, three nundred twenty-three thousand, three handred Minety-one
- three on, aid, ninehundred ninety frousand. nine hundred ninety-two
- three mi fard, one numbed ten mitton. m nety-nine thousand, flour standled in thety-three



Preparation

Write-the range numbers on the notificants on paper in advance.

DIGITAL

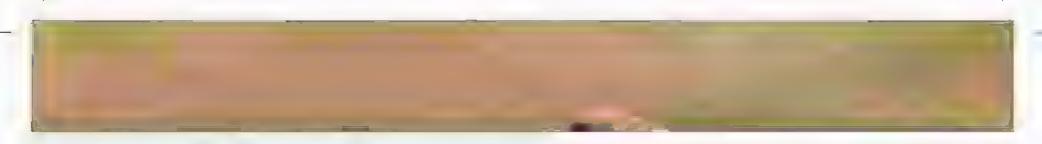


Lusson 9

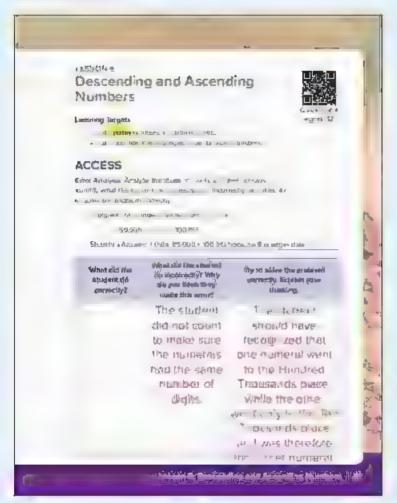
Descending and **Ascending Numbers**



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Student Page 41



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may not understand the place value relationships between the standard, word, and expar ded forms of a number
- Studenternay not understand that numbers can be prefered in multiple forting (standard, word, or expanded form)
- Students may struggle to compare and order
 mumbers with similar digits and need to be
 primated to start on the left and compare each
 order while moving to the right of a number.

Error Analysis

- Ask students to turn to Lesson 9 ACCESS Brow Analysis and so we the error analysis problem.
- After 6–7 m nutes, ask students to share their answers and thinking with the class
- 3 Ask students to discuss how so ving error and yels problems helps them become better mathematicians

Lesson 9 . Descending and Ascending Numbers



BUILD (40 min)



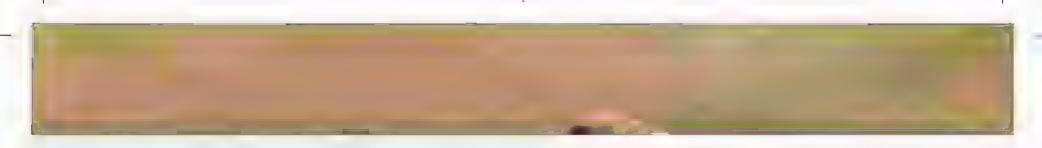
Ascending and Descending Numbers

- Ask students to recall what they learned and practiced in the feet lesson. Then, explain that today they take the next step in comparing as they order arge numbers.
- 2 Te : students that we can soft numbers in either ascending or descending order. Ascending order is when numbers as up like an art waring up an ant mi. They ascend up the him Connect to ordering numbers from east to greatest. Descending order is when numbers up down the apatit warring down an art. hill. They descend to the bottom. Connect to ordering numbers from greatest to least
- 3 Direct students to Lesson 9 BUILD Ascending and Descending Numbers Ask a student volunteer to read the scenario aloud
- 4 Ask students to complete Problem 1, isting the numbers from Omar's data in ascending order
- After students are finished, use Calling Sticks to choose five volunteers come to the front of the room. Give each students a notecard with one of Omagis data paints on it. Have students stand in a ne facing the class holding the numbers in front of them.
- 6 Ask spated students to help arrange the numbers in ascending order (as they did in their Student Materials.) Ask students to share their reasoning and strategies for ordering the numbers as they did
- 7 Have students return to their Student Materials and complete Problem 2, listing Manam's data in descending order
- 8. After a few minutes, use Calling Sticks to select 4-new students and repeat the ordering process, having seated students arrange the standing students and sharing their reasoning and strategies

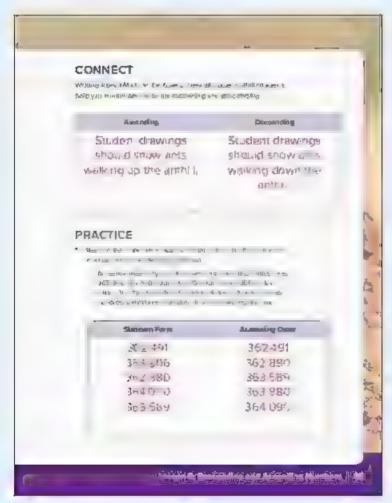
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Student Page 42





Student Page 45



- 9. Ask students to solve Problem 3 on their own After a few minutes, go over the answers together Ask students to share their reasoning and strategies for ordering numbers written in different forms.
- 10' if students are ready have them complete BuiLD Problems 3–5 on their own or with a partner

CONNECT (7 min)



Writing About Math

- Direct students to Lesson 9 CGN NECT Writing About Math and ask them to respond to the prompt
- 2 If the allows, ask students to volunties to show the norwhogs of do a Garery War.

 1. Jet. Sec. Joseph and Joseph 1 or the answer and and an aptin 1 or the answer and and an aptin 1 or the answer of the answer

WRAP-UP (3 min)

Let's Chat About Our Learning

- f Ask students to talk with their Shoulder Partner about the strategies they used for ordering very large numbers in multiple forms
- 2 After about 30 seconds, have volunteers share their ideas. Add effective strategies to the class anchor chart started in Lesson 8 Remind students they can refer to the chart for assistance and support.

Lasson 9 . Descending and Ascending Numbers



PRACTICE

Direct students to 'Lesson 9 PRACTICE and have them complete the problems. Address student errors and this conceptions

Check Your Understanding

1 Rewhite the mumera's below in standard form. Then, list the numera's impescending order (greatest to least).

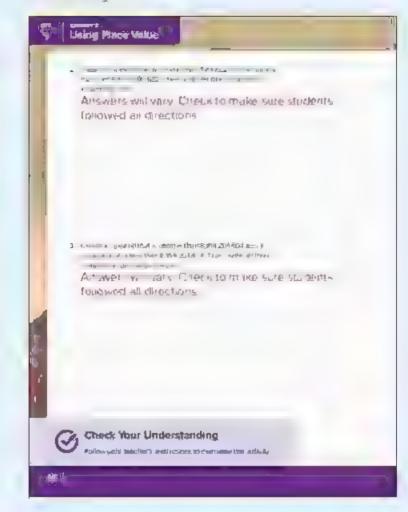
six hundred farty three-thousand, nine hundred nineteen, 634.920 (6 × 100,000) + (4 × 10,000) + (3 × 1,000) + (9 × 100) +-(2 × 10); 600,000 + 40,000 + 4,000 + 10.9x hundred forty-four thousand, two numbed ninety-nine

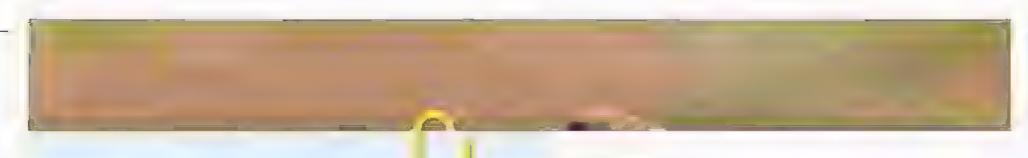
Standard Form	Descending Order
120%	644.20~
েন্ধ্ৰ ৫. 🗎	⊘ 44 ∂1°
r 4 = 2 "	543 ×2"
64 10	543,91-
141200	634 920

- 2 Create a numeral that signeater than 682 367 and armeral that signs than 683 367 pen, write a three numerals in ascending order for the resolutions.
- 3. Create a numera, that is greater than 4,195,168 and a numera, that is essitian 4,199,264,318. Then, write a three pumeration descending order. Answers we vary Check to name that the derivative followed all directions.

PRINT

Student Page 46







Materials List

No additional materials are needed

LESSON 10 Predicting the Unpredictable

Lesson Overview

In this lesson, students shift the conversation on place value to the concept of estimation. They datermine when an exact answer is needed and when an estimation is appropriate. This lesson also extends to very large numbers students' understanding and application of front and est mation

Lesson Essential Question

How does estimating heip me soive problems?

Learning Objectives

In this lesson

- Students will explain front end estimation.
- Students will use front and estimation to approximate large numbers

Grade-Level Standards

4.C.1. Assess the reasonableness of answers using mental computation and estimation strategies including rounding



Vocabulary Check-In

astimation, front-and estimation, reasonstite

DIGITAL



Predicting the Unpredictable



egrint4013

Lesson 10 . Predicting the Unpredictable



ACCESS (10 min)



COMMON MISCONCEPTIONS AND

- Students may struggle with knowing when to estimate and when an exact muchber is needed to solve a problem.
- Stuberits may confuse front end estimation with officer duriding strategies
- Students may not understand the value of determining the teasonableness of answers.

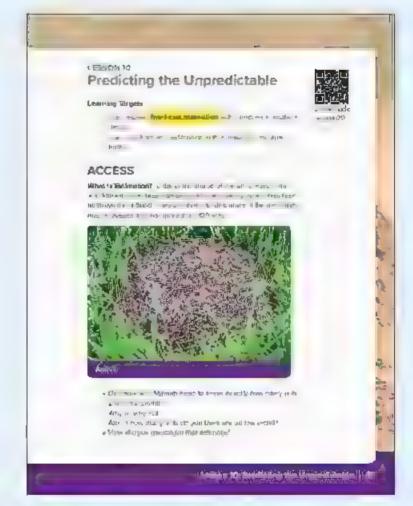
What Is Estimation?

- I Ask statients to talk to a partner to define the word estimate and share what they remember about estimating from Primary 2 and Primary 3. Ask volunteers to share their thinking with the class
- 2 Ask students to describe some studions when estimation might be useful (Possible answers may holyde when you are trying techgure out "about how much," when you are at the market and need to know about how much your grocenes will cost, when you are trying to determine about how long something is a month take or about how for away something is a
- 3. Make sure students know the following
 - When we estimate, we find a value or answer that is close to the actual answer
 - There are different strategies we can use to estimate
 - Est mation can be used in situations in which an exact ariswer or number is not needed
 - Est mation can help us determine whether or not our answer is reasonable
- 4. Direct students to Lesson 10 ACCESS What is Estimation? and ask them to observe the mage of an anticolony. Ask a volunteer read around the scenario.
- Allow time for students to briefly discuss the questions with a partner of small group
- 6 After a minute or so, have students share their thinking with the whole group.

 Answers may vary. That it is not table after a time.

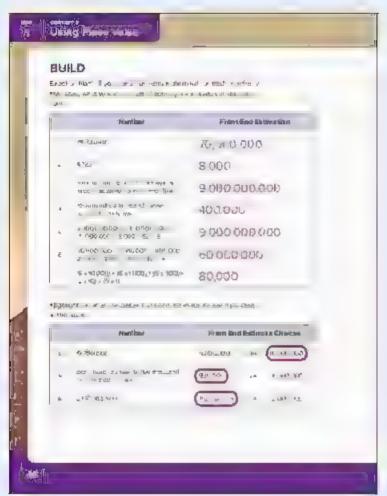
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Student Page 48



BUILD (40 min)



Exact or Not?

- 1 Tell students that there are times when they meed an exact enswer and times when an est mate is good enough.
- Play Rop-up to help students consider when it is oray to estimate and when they should find exact numbers

Directions

- Al students begin scated
- The teacher gives a scenario
- Students Pop-Up (stand) if they think the best way to so we the problem is through estimation
- The teacher calls on one student who Propped-up and one who stayed seated to explain their reason no

TEACHER N 16 - que v com 16 - com 16 -

Scenarios

- Pop-Up if you could estimate how many balls are needed at recess. (Yes)
- Fop-Up if you could esumate how many grams of floor you need to bake bread (No)
- Pop-up if you could estimate the amount you give to the store clerk (h.:.)
- Pop-Up of you could estimate the amount of medicine to take for a cold if in.
- Pop-Up if you could estimate how many people would fit on a bus (ries)
- 3. Ask students to work with a partner to create at east one more scenario that would require an exact answer and at least one more scenario where an estimate way, disuffice. (Students who finish early can create additional scenarios.)
- If time permits, choose a few students to read their scenarios and play Pop-Up again

Lesson 10 . Fredicting the Unpredictable



1 Using Place Value

- S. Ask students to talk to their Shoulder Partner about what they specifically remember about how to do front end estimation. Call on students to share with the whole group (Students may recall the following front-end estimation gives them an approximate answer, in front end estimation, they look only at the first digit mithe number and each subsequent digit percents a 0; this estimation strategy is not always accurate/does not confistently get close; front-end est mation is the simplest estimation strategy).
- b. Model a few front-ensitestimation problems on the board. Have students he piyou as much as possible Remind students that they should keep the first number and turn the remaining numbers to zeroes For example, 36 becomes 30, 492 becomes 400; and 71,999 percents 70,000
- 7. Have students work independently to complete the practice problems in Jessen 10 BL, LD Exact or Not? Remind students to record their estimates in standard form

CONNECT (7 min)



Writing About Math

Direct students to Lesson 10 CONNECT Writing About Math and ask them to respond to the prompt

WRAP-UP (3 min)

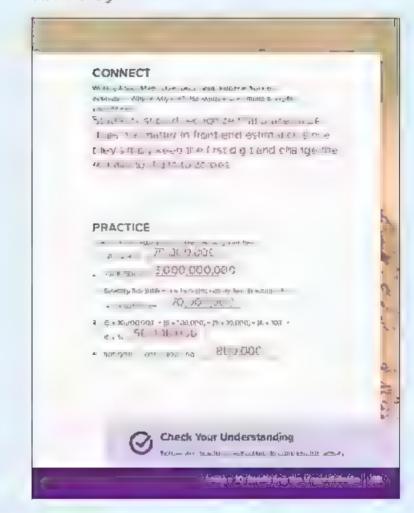


Checking My Own Progress

- 1. Ask students to read the Learning Target for the essen and reflect on how we, they can meet the target right now.
- Asis students to self-reflect using a Flot-to-Five, where "fiet" indicates no understanding and "five fingers" indicates a deep understanding of a Learns
- 3 Remind students that they will continue to practice math skins as they earn new concepts and that they should always ask for help if they need it.

PRINT

Standent Page 49







PRACTICE

Direct students to Lesson 10 PRACTICE and have them complete the problems. Address student errors and misconceptions

Check Your Understanding

1. Define front and est mation in your own words

It get to should mention using the digit in the largest place in the planners or the digit

with the highest place is the large.

use front-end estimation for the following numbers

- 2. 86,433,920
- 3 6 627,513,202 - 000 000 000
- 4. One hundred sixty-three mulion, fourthundred thirty thousand, eight hundred two 100 000 000
- 5 (\$\text{\$\times\$} \tau_000 \times 000) \div (\$\times\$ \tau_0000) \div (\$\times\$ \tau_000) \div (\$\times\$ \div (\$\times\$ \tau_000) \div (\$\times\$ \tau_000) \div (\$\times\$ \div (\$\times\$ \tau_000) \div (\$\times\$ \div (\$\times\$ \tau_000) \div (\$\times\$ \div (\$\t
- 6. 798,900 + 7,900 + 700 + 70 # 7 700 000

Lesson 10 • Predicting the Unpredictable



LESSON 11 Rounding Rules

Lesson Overview

In this essen, students apply their understanding of page value to rounding numbers. They discuss which process for astimation—rounding or front and estimation—dives them a more acquirate estimate.

Lesson Essential Question

How can prace value help us understand rounding?

Learning Objectives

In this lesson

- Students will apply multiple strategies to round numbers
- Students will discuss whether rounding or front and estimation provide a more accurate estimate.

Grade-Level Standards

4.C.1.• Assess the reasonableness of answers using mental computation and estimation strategies including rounding



Vocabulary Check-in

accurate, estimation, nearest, reasonable, rounding



Materials List

- 2 sets of Large Dight Cards 0-9 (for the teacher)
- Rounding Rule on chart paper
 Cincle the aight look next door
 Sor higher! Add one more
 4 or less? Let it next



Preparation

Write the Roumaing Rule on chart paper in advance.

DIGITAL

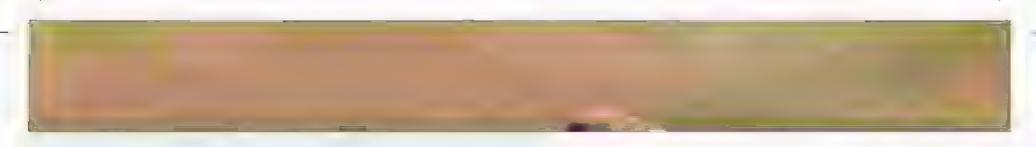


Lesson 11

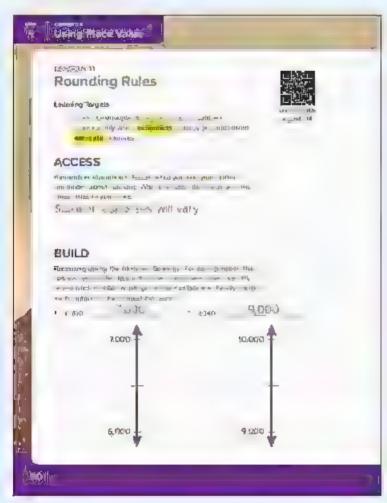
Rounding Rules



Ou ox Code eqmi4014



Student Page 50



ACCESS (10 min)



COMMON MISCONCEPTIONS AND

- Students may meappy the rule for rounding down and actually lower the value of the digit in the designated place instead of keeping little same or increasing it thy one.
- Students may mesapply the rule for rounding up and thringe the digit in the designated place, while not changing digits in smaller places to zeroes.
- Students often only use front and estimation for determining the reasonableness of answers.
 Rounding provides more accurate estimates.

Remember Rounding?

- f. Direct students to Lesson 11 ACCESS Remember Rounding and read the directions aloud. Students should talk with their Shoulder Partner about what they remember about rounding from Primary 3 and record their notes in their Student Materials.
- 2 Ask volunteers to share them thinking with the class. Record accurate ideas on the board. Brigage students in a discussion about rounding, asking quest, one to help quide their thinking. Before moving on to Bull D, make sure the following concepts are recorded.
 - Rounding is a form of estimation
 - Rounding can be used when an exact answer is not needed
 - Rounding can get us obser to the actual answer than front-end estimation
 - Reunding is similar to front-end estimation in that it changes a number to a snorter of simpler number that is close to the origina.
 - Unit se front-end estimation, there are rules to rounding and the digit in the place you are rounding to may change
- After the discussion, give students a few minutes to add the class notes to their notes of time does not a low, leave the notes up so students can copy them ater.

Lesson 11 • Rounding Rules 59

BUILD (40 min)

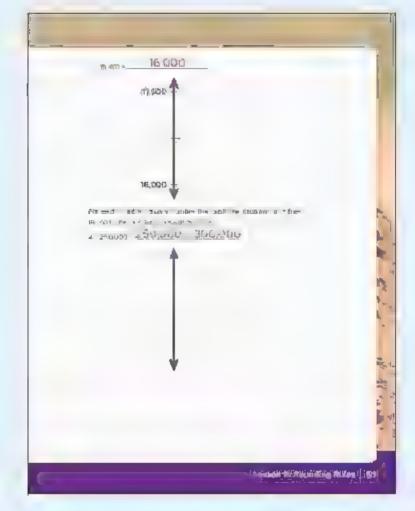


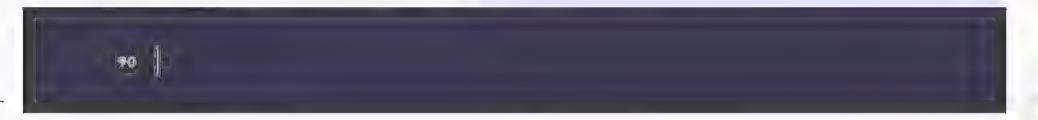
Rounding Using the Midpoint Strategy (20 mm)

- 1 Draw a vertica number the on the board with 10 at the top and 0 at the bottom. Draw a m dpoint, but up not abelia.
- 2. Ask a volunteer to identify what number would be written on the midpoint of the number line. When it is correctly identified, labe the number line.
- 3 Ask students where they would put 8 on the number the Have a voluntaer mark and record 8 on the number line. Have them explain their reasoning
- 4. Repeat the process with 5,000 and 4,000
- 5. Once the midpoint is abeled, ask students where they would put the number 4.675 on the number ne Have a volunteer record where the number should go on the vertical number line. Have them explain their reasoning
- Be Point out that 4,000 is at the bottom of the number in and 5,000 is at the top of the number line use Calling Sticks to ask if 4,575 which Thousand 4,675 is nearest to Ask students to explain how the vertical number line and the millipoint, helps that place numbers on the number line.
- 7. Explain to students that they just rounded 4,675 to the nearest Thousand. On the number one 4,675 was nearest to 5,000, so we rounded if up to 5,000.
- B Record another vertica in imper line on the board with 20,000 at the bottom and 30,000 at the top with 25,000 as the midpoint. Ask volunteers to show where they trink 23,400 should go on the number ine have students explain their reasoning.
- 9 fivext, ask students to Turn and Taul about which Ten Thousand 23,400 is nearest to—20,000 or 30,000. Discuss "Confirm that 20,000 is the nearest Ten Thousand, so we would round 23,400 down to 20,000

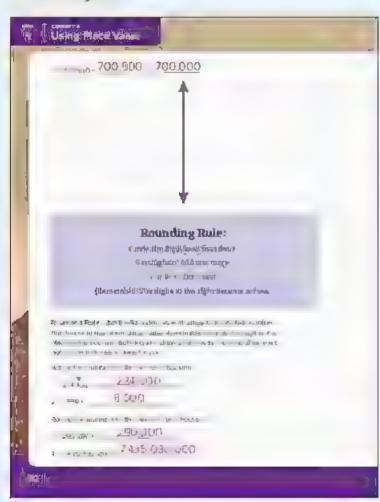
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Student Page 52



- 10. Direct students to Lesson 11 Build Rounding Using the Midpoint Strategy and ask them to work with a partner to solve Problems 1–5. If students appear to be strugging, regroup the whole class and work together to solve the problems. Se sure to discuss Problem 4, where the number is exactly at the midpoint.
- 11 After about seven minutes, go over the answers together and comify any confusion.

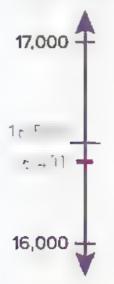
Student Number Lines

- 1. 6,700 = 7,000
- 2. 9,340 ≈ 9,000





- 3. 16.404 = 16.000
- 4. 250 000 = 300 907.





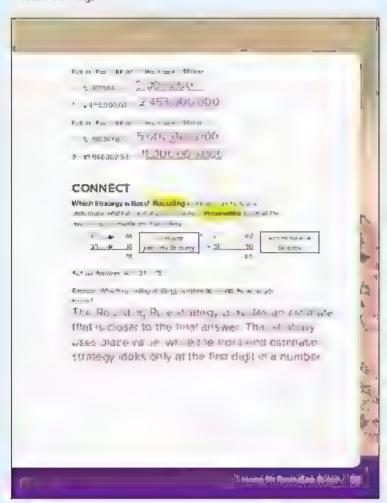


Rounding Rule (20 mm)

- 1. Explain that knowling the midpoint is a good fed for reunding, but there are other strategies that they may find more helpful.
- 2 Have two sets of arge dight cards 0–9. Ask for 4 volunteers to some to the front of the room. Give each student a card and have teem stand in a line to create the humeral 4.675.
- 3 To students we want to round the number to the nearest Thousand. As a students to dentify which student is in that place. Have that student step forward
- 4. Next, display the Rounding Rule and read it aloud
- 5 Point to the 4 in the Incusands place and mode leading "next door," by raving the student holding the 4 box at the student in the lunereds place. Ask students to repeat the rule and then decide if the 4 should add one more or etitrest and stay the same. (Students should recognize they need to add one more to the digit in the Thousands place.)
- b. Remind students that earlier they used the midpoint to help them determine that 4,6/5 was closer to 5,000. The Rounding Rule tells us that, too, since it tells us we should add one more to the Thousands place and then all the other places become zeros.
- Repeat the activity using the numbers 4,123 (nearest Thousand), 13,457 (nearest Thousand and nearest mundred), and 256,962 (nearest Ten Thousand and nearest Ten)
- 8: Debrief the activity highlighting the connection between the midpoint strategy and the Rounding Bulle strategy
- Place students turn to Lesson 11 Build Rounding Rule to practice rounding using the Rounding Rule strategy. Depending on their readiness, students may work independently, in pairs, or in small droups.



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CONNECT (5 min)



Which Strategy is Best?

Direct students to Lesson 1.1 CONNECT Which Strategy is Best? Ask students to read the statement about nounding and discuss as a whole group

WRAP-UP (5 min)

Place Value and Rounding

- 1 Ask students to tak to a partner about the following question: Does place value matter in rounding? Why or why net?
- 2 After a minute, ask valunteers to share their deas Pocho a plays an important role in counding because it requires thermto look at the place they are rounding to and at the digit in the place to the high. Otherwise they will not be able to round the minute.

PRACTICE

Direct students to besson 11 PRACTICE and have them complete the problems. Address student errors and imisconceptions

Check Your Understanding

use the Rounding Rule strategy to solve the problems balew. Remember to thrue the digit you are rounding to

Round the numbers below to the Incusands place

- 1. 9,621 = 10,000
- 2 42,502 ~ 13,000
- 3 824,157 = 824,000

Round the numbers below to the Hundreds place

- 4. 10,671 = 10 1
- 5 423,502 = 423,50t
- 6 1,632,542 = 1,632,500
- "High light or since the number that shows 1,236,532,748 rounded to the Ten Millions place

1,230,600,000

1,240,000,000

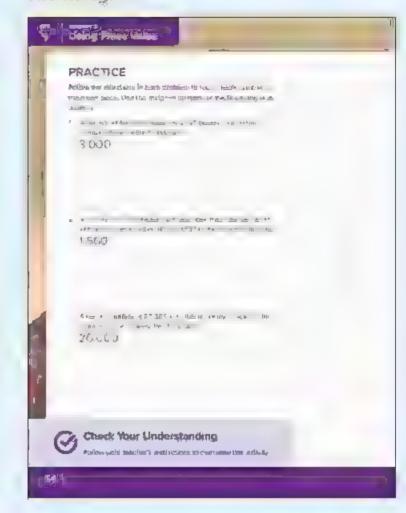
9 High got of city at the number that shows 1,435,532,748 (rounded to the Whilands place)

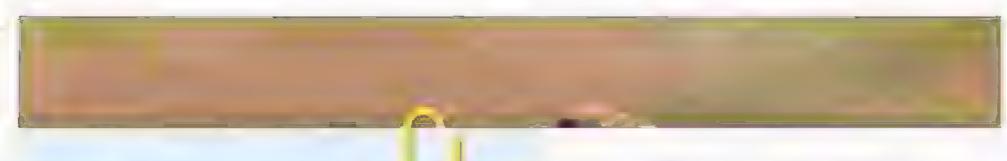
1 000 000/000

2,000,000,000

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Student Page 54







Materials List

Waterials may vary

DIGITAL



Concept Check-in and Remediation



Quick Code egmt4015

Concept Check-In and Remediation

Lesson Overview

In this essent, students work to contect im scoriceptions and errors from Concept 2 Using Place Value First, administer the Concept Check-in. Once you have reviewed the quiz results, choose remediation activities based on the needs of your students. Some recommendations are insteal below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or in a small group with the teacher.

Concept Essential Questions

- How can we efficiently compare and order very large numbers?
- How can understanding place value he plus order very arge numbers?
- How does estimating help me so ve problems?
- how can prace value help us understand rounding?

Learning Objectives

in this lesson

 Students will work to correct misconceptions and errors related to comparing, ordering, and rounding numbers

Grade-Level Standards

4.A.1.c Read and write numbers up to a milliard (billion) Lising numerals, word form, and expanded form

4.A.1.d Use place value understanding to round multidigit whole numbers up to the Milliards (Billions) place

4.A.1.. Order a set of numbers up to the Milliands place

Concept Check-in and Remediation



4.A.1.f Compare two multi-digit numbers using the symbols <, >, = to express the relationship.

4.C.1. Assess the reasonableness of answers using mental computation and estimation stratedies including rounding



Vocabulary Check-in

Review concept vocabulary as needed.

COMMON MISCONCEPTIONS AND ERRORS

- Students do not then consider how many digits are in animals living they compare
- Students may struggle with comparing numbers in word form or expanded notation
- Students may struggle with finding asystem that being them compare numbers in different forthe.
- Students may not understand the place value reliationships between the standard. word, and expanded forms of a number
- Students may struggle to compare and order numbers with a milar digits and need to be reminded to start on the right of a
- Students may struggle with knowing when to estimate and when all exact number is riceded to solve a problem
- Students may misepply the rule for rounding down and actually lower the value of the digiting the pesignated place instead of keeping if the same or increasing it by one
- Students may misapply the muellar rounding up and change the dight in the designated place will enot changing digits in smaller places to zeroes.

H...

Students strugg a with comparing numbers in word form or expanded notation

Then

Review Strategies for Comparison in Lesson 8. Consider having students convertinumbers to standard form before comparing them, Help students understand the relationships between standard form, word form and expanded form, use a place value draft to help them see the relationships

H...

Students struggle to compare and order numbers with similar dugits and need to be reminded to start on the left and compare each digit while moving to the right of a number

Then...

Review Lesson 9, Consider engaging students in a hands-on activity to which they represent the digits in the numbers they are comparing. In the activity, students holding a digit in the same place can step forward and compare their numbers.

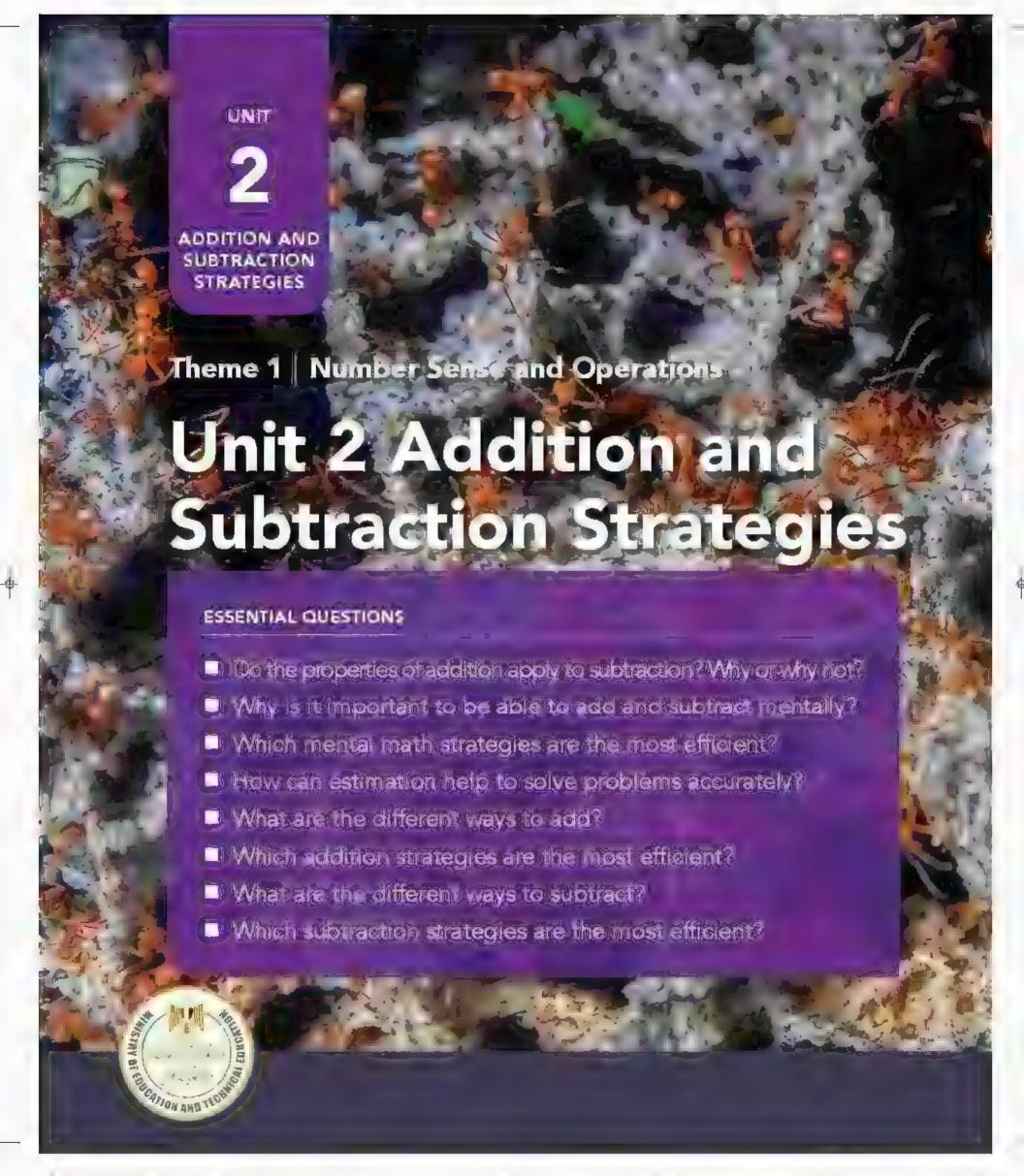
If...

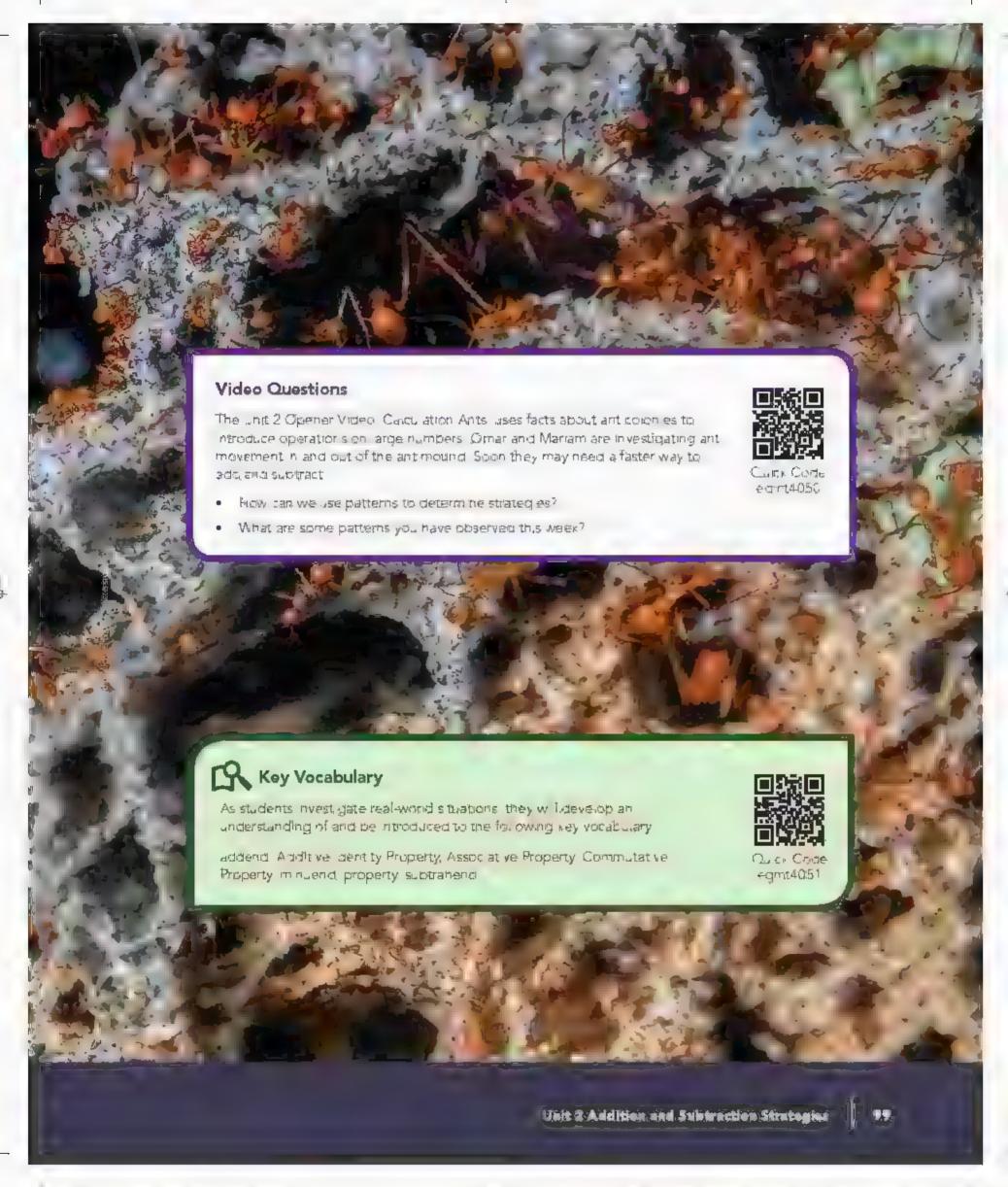
Students do not understand that the digits to the right of the rounded place all become zeros

Then...

Review Lesson 1.1 Consider angaging students in additional hands-on practice in which they represent the digits in the numbers they are rounding, in the activity, the student standing in the place they are rounding to can step forward, students can make a rounding decision, and the remaining numbers can turn their cards over to change to zeroes

Concept Check-in and Remediation





Addition and Subtraction Strategies

Unit Storyline



Unit 2 Addition and Subtraction Strategies Storyline

The Addition and Subtraction Strategies unit extends students' working knowledge of whole numbers and the place value system in the context of addition and subtraction. Students apply these understandings to develop strategies for efficient mental mathematic estimation. Students observe video of ants to support learning and enhance their knowledge of addition and subtraction properties.

Unit Standards

4.A.2	Use place value understanding and properties of operations to perform mutined git at immerit
4.A.2,a	Filertly add and subtract mult, digit who e numbers
4.C.1.d	So we multi-step word problems posed with whole mambers using the four operations, including problems in which remainders must be interpreted
4.C.1.d.1	Use letters in equations to represent unlinowh quantities
4.C.1.s	Assess the reasonab eriess of answers using mental computation

Unit 2 Structure and Pacing

If Mathematics instruction is based on 60 minutes/5 days a week, deliver the lessons as written in the Teacher Edition.

Concept 1: Using Addition and Subtraction Strategies

Essential Questions

Lesson 1

Lesson 2

- Do the properties of addition apply to subtraction? Why or why not?
- · Why is it important to be able to add and subtract mentally?
- · Which media, math strategies are the most efficient?
- How can estimation nelp to solve problems accurately?
- What are the different ways to add?
- Which addition strategies are the most efficient?
- What are the different ways to subtract?
- Which subtraction strategies are the most efficient?

Properties of Addition

Learning Objectives

- Students will identify the properties of addition and subtraction.
- Students will explain the properties of addition and subtraction.
- Students will investigate to determine whathar the pruperties of addition apply to subtraction

Student Learning Targets

- rearr dentify the properties of addition.
- · I'man explain the properties of addition
- I'tran: Investigate to determine if addition properties apply to subtraction.

Review Mental Math Strategies

Learning Objectives

- Students will apply a variety of strategies to add and subtract mentally.
- Students will explain the Importance of mental math skills

Student Learning Targets

- I can apply a variety of strategies to add and subtract mentally
- . I can explain why it is important to be able to do mental math.

Unit 2 Addition and Subtraction Strategies



Unit Structure and Pacing cont'd

Addition with Regrouping

Learning Objectives

Lesson 3

- Students w. I add multiplight whole numbers
- Students will estimate to determine if their answer is reasonable.

Student Learning Targets

- I dan add multid git whole numbers
- · I can estimate to check the reasonab eness of my answers

Subtraction Strategies

Learning Objectives

- · Students will use decomposition of numbers to subtract multid git whole numbers
- Students will explain the importance of finding patrains and relationships in relationates

Lesson 4

Lasson 5

Student Learning Targets

- "can use piace value to decompose numbers in order to subtract.
- "can explain the importance of finding patterns and relationships to solve problems.

Subtraction with Regrouping

Learning Objective

- Students will use place value to subtract using the standard algorithm.
- Students will subtract with regrouping
- . Students will estimate to check the reasonableness of their answers

Student Learning Target

- I can use place value to help the subtract with regrouping
- · lean estimate to theci the reasonableness of my answers

Concept Check-In and Remediation

Learning Objective

 Students will work to correct misconceptions and arrors related to using addition and subtraction strategies

Student Learning Target

 l'can correct my misconceptions and errors related to being addition and subtraction strategies



Concept 2: Solving Multistep Problems

Essential Questions

- What are the different ways to add and substact?
- William strategies are the knost afficient?
- . How cap estimation halp me solve problems accurately?

Bar Models, Variables, and Story Problems

Learning Objectives

- Students will use letters to represent unknown quantities in equations
- Students will use bar mindels to represent and solve story problems.
- . Students will solve for the variable in an equation

Leszon 6

Lesson 7

Student Learning Targets

- I can use letters to represent unknown quantities in equations
- I cast use par models to represent and so ve story problems.
- Tean solve equations that include variables

Solving Multistep Story Problems with Addition and Subtraction

Learning Objectives

- Students Wr solve multistep story brob ems
- · Students we explain how they so ved multistep story problems

Student Learning Targets

- can so ve multistep story proteents
- can explain how I selved multistep story problems.

Concept Check-In and Remediation

Learning Objectives

 Students www. work to correct inisconceptions and errors related to solving multistep problems

Student Learning Target

I can correct my misophoaptions and emors related to solving multistep problems.

Unit 2 Addition and Subtraction Strategies



Alternate Pacing Guides

If Mathematics instruction is based on 45 minutes/5 days a week, do the following:

Reduce ACCESS by 3 minutes

Reduce Bull D by 8 minutes

Reduce CONNECT by 2 minutes

Reduce WRAP-UP by 2-minutes

Strategies for reducing time in each section include

- · dissussing fewer examples
- · e iminating Showder Partner conversations
- shortening class discussions
- working with students to complete ACCESS problems

If Mathematics instruction is based on 45 minutes/4 days a week and 90 minutes 1 day a week, do the following:

Follow the 45-minute approach for the 45-minute-days.

Teach two 45-minute lessons on the 90-minute day

If Mathematics instruction is based on 90 minutes/5 days a week, do the following:

herease ACCESS by 5 minutes

processe BUILD by 20 minutes

Increase CONNECT by 3 militates

increase WRAP-UP by 2 minutes

Strategies for increasing time in each section include

- a soussing additional gramples as needed
- extending class discussions
- allowing time for hands-on work with manipulatives and models
- providing additional practice problems for students who need additional practice
- encouraging students to share and mode their problem-solving strategies



Mathematical Background Knowledge

Using Addition and Subtraction Strategies

In this unit, students learn many strategies to some addition problems, as we has understand properties of multiplication which miner these of addition. As students move to Primary 5, they apply these same properties to decimals and fractions, understanding the properties of adult on a lows students to see that equations can be flexible. For example, there is more than one way to write an addition equation. This understanding pakes the way for a stronger runther sense, as students learn to manipulate equations to make them simpler to solve. An example of this might be a problem such as I = I = I. With an understanding of the Commutative Property, students may choose to combine the I and I first to make a benchmark number (10) and then add the 15. This may be more efficient than solving the problem from left to right as originally written, when I multiple mental math strategies alids in computation as well as demonstrates a strong number sense.

In Primary 3, students created and explained strated as for so ving addition problems. They also learned the formal argorithm and now to regroup numbers arger than 10. They est mated their answers as both a way to predict the sum and as a way to sheek their completed work. Students apply these strategies again in Primary 5 when they add and subtract decimals up to the thousandths place. Decomposing numbers was taught in unit 1 of Primary 4 and is used in this lesson to necomplish numbers in order to effectively subtract in Primary 5, sudents will apply these same strategies as they work with decimals.

in Firmary 4, students continue to gain fluency with the standard algorithm so ving bare number problems with up to seven digits. In Frimary 5, students apply their understanding of place value and the standard algorithm to whole numbers and decimals

Solving Multistep Problems

in Primary 3, students were introduced to the concept of symbols representing unknown quantities in equations. They used number beings and bar models to help solve for an unknown. Students also learned that the equal sign shows that numbers on both sides of an equation are balanced in Primary 4, students use variables to represent unknown quantities in equations. This early algebraic concept transfers to Primary 5 and beyond

In Primary 3, students solved multistep story problems using a four operations. In Primary 4, students write equations to represent story problems if volving a variety of operations, using variables to represent unknowns. Students use mathematical terminology to explain why they chose their problem-solving strategies.

Jult 2 Addition and Subtraction Strategies





Concept Overview

In Concept 1: Using Addition and Subtraction Strategies istudents review and explore addition and subtraction strategies, noted not mental math strategies and the standard addition and subtraction algorithms. This work helps prepare students for working with argerin, impers and provides context for the importance of estimating to check the reasonableness of answers. Although instruction in addition and subtraction strategies does not explicitly continue after upit 2 students should continue to practice throughout the year in a valuety of contexts, including pare number problems, story problems, math projects, and assessments.

Concept Standards

4.A.2 Use place value understanding and properties of operations to perform the cut and imetic

4.A.2.a Fluently add and subtract multi-digit whole numbers

4.C.1.d So ve multi-step word problems posed with whole numbers using the four operations including problems in which remainders must be interpreted

4.C.1.a Assess the reasonableness of answers using mental computation

Cancept 1 Using Addition and Subtraction Strategies

- \$

Concept Planner

A lessons are designed to be 60 minutes. The materials isted in this chart are items to gather for each group. Items for the class or for individual students are and rated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
Properties of Addition	Properties of Addition anchor chart on chart paper (See the example at the end of the volume.) Mathematics Too. Kit anchor chart on chart paper (See the example at the end of the volume.)	Addend Ad	Students will dentify the properties of addition and subtraction Students will explain the properties of addition and subtraction Students will investigate to determine whether the properties of addition apply to subtraction
Review Merrial Metro Strategies	Mental Math Strategies anchor chart Thinking Like a Mathematician anchor chart	Benchmärk numbers Est mate Montal math Round	Students will apply a variety of strategies to account subtract mentally Students will explain the importance of mental mathisk is



Common Misconceptions and Errors



Opportunities for Formative Assessment

 Students may not understand that, a though the order of numbers does not matter in an addition problem, it matters greatly and changes the answer in a subtraction problem.

 Students may struggle to remember the difference between the Associative and Commutative Properties

Do the Properties Apply? Writing About Math, Practice, Chack Your Understanding

 When using compensation to treatally add and subtract; students are often uncear now to barance the amount compensated.

Mental Math Strategies, Writing About Math, Practice, Check Your Understanding

Concept 1 Using Addition and Subtraction Strategies

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Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
Regrouping	■ 料心 actiu f oran finaterons needed	å gordäni	 Students will add multiple numbers Students will estimate to determine if their answer is reasonable
4 Subtraction Strategies	Mental Math Strategles anchor chart (Prior to the lesson, add the strategles Counting Back with Decomposition and Counting up with Decomposition to the anchor chart.) Thinking Like a Mathematician anchor chart.	Difference Mirwand Subtramend	Students will use decomposition of numbers to subtract multidight whole numbers Students will explain the apportance of finding patterns and relationships and mathematics.
Subtraction with Regrouping	Draw a place value chart on the poard showing Thousands and Ones periods Labe four sheets of paper with a subtraction strategy of Standard Subtract on Algorithm of Counting Up with Decomposition Counting Down with Decomposition Other strategy	Agarithm. Regroup	 Students will use place value to subtract using the standard algorithm Students will subtract will regrouping Students will estimate to check the reasonableness of their answers

- Students they struggle with regrouping whether using the star dema agonting or decomposing by place value.
- Students may aways start a number line at 0, in problems that use arge numbers, it is important to start a number line with numbers other than 0
- Students may struggle with decomposing numbers in ways that make sense to them
- Students may struggle with where to place numbers on an open number line

- Students may struggle to understand the standard agorithm for subtraction when regrouping is required. They do not decompose into smaller units to so ve.
- Students terrolic mode both the subtrahend and in rulend instead of recognizing that the minutend is the only number to mode since the subtrahend will be taken away from that larger number

(F)

Opportunities for Formative Assessment

Error Analysis, Est make and Solve, Bridging Ants and Addhon, Practice, Check Your Understanding

Exploring Subtraction Strategies Writing About Math, Fractics, Check Your Understanding

Effor Analysis, Ant Facts and Algorithms, Practice, Check tour upgerstanding

Concept 1 Using Addition and Subtraction Strategies

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_	X15
	(F)
	_

Lesson	Materials for Lesson	Vocabulary	Learning
Name		Terms	Objectives
Cuntept Check in and Remediation	Materials spay vary	Review cor cépt vocabulary as needed	Students will work to correct misconcept ons and errors related to using additionable and subtract, on strategies.

Opportunities for Assessment:

n addition to the assessment opportunities included in this chart, each concept will include a Concept Check in



Common Misconceptions and Errors

- Students may not understand that, athough the order of numbers does not matter in an addition problem, it matters greatly and changes the answer with a subtraction problem.
- Students may struggle to remember the difference between the Associative and Commutative Properties
- When using compensation to mentally add and subtract, students are often unclear new to be ance the amount compensated
- When regrouping, students may studge e with whether to use the standard algorithm or decompose by place value
- Students may struggle with decomposing numbers in ways that make mental materies en



Opportunities for Formative Assessment

Contest Chee In

Concept 1 Using Addition and Subtraction Strategies

CONCEPT

Using Addition and Subtraction Strategies

LESSON 1 **Properties of Addition**

Lesson Overview

in this essen, students earn the Commutative, Associative, and Add tive dentity Properties of Addition. They build understanding of each property. learn how the properties help them so ve addition. problems, and apply each property to create and solve equal ons They also investigate whether the same phaperties apply to subtraction, confining or refiging their pradictions afterward,

Lesson Essential Question

 Do the properties of addition apply to subtraction? Why arwhy het?

Learning Objectives

in this lesson

- Students will identify the properties of addition and subtraction
- Students will exprein the properties of add fron and s...biracijem
- Students will investigate to determine whether the properties of add tight apply to subtraction.

Grade-Level Standards

4.A.2 use place value understanding and properties of operations to perform multild git antimetic

4.A.2.a Fluently add and subtract multidigit whole nambers



Vocabulary Check-in

addend. Additive Ident by Property, Associative Property, Committeelive Property, minuend, property, subtrahend



Materials List

- Broperties of Addition anchor chaft on that parm (see the example at the and of this volume!
- Mathematics Too. Kill anchor shart on. "that paper (see the example at the and" of this volume)



Preparation

Photosopy the Blacking Master at the end of This volume

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Properties of Addition



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ACCESS (10 min)



- Students may not understand that, anhough the dider of murnbers abes not matter. In an addition problem, it matters greatly and charges the abover in a subtraction problem.
- Students may, strugg # to remember the difference between the Associative and Commutative Properties

Expanded Form Review

- 1 Expedip to students that in this unit they we use what they have earned about rounding and number forms and apply it to add tion and subtraction.
- 2 Ask students to turn to Lesson 1 ACCESS Expanded Form Review in their Student Materials
- Read the following numbers aloud and ask students to will be them in standard form
 - 1. 3,000 ± 400 ± 20 ± 7
 - 2 9.000 + 800 10
 - 3. 400,000 ± 30,000 ± 9,000 + 800
 - 4 1,000,000 000 # 5,000 000 # 8,000
- 4. Go over the answers as a class. Ten students that breaking numbers into place value is a skill they will use during addition.

BUILD (40 min)



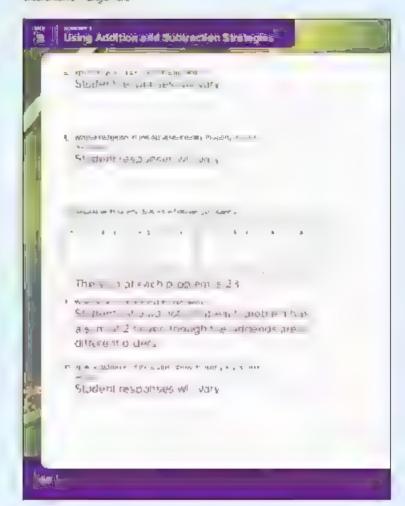
Additive Identity Property (10 mm)

- Tell students that in mathematics, properties are characteristics that be ong to a set of numbers. Properties are always true, so a property of addition will always be true.
- 2. Ask students to turn to besson 1 But D Additive Identity Property. Ask students to share what they know about the number send Possilie and Additive in the following that is a compact to a proper or 1 to an angeline and the compact the same of the same of
- 3 Asi, students to so /e inob ems 1 4
- do over the answers with the class. Ask students to discuss what they noticed about the problems and their solutions and the definitions they wrote Students. In the time of their solutions and the definitions they wrote Students are as a second ask students to revise their work fineeded.

Commutative Property and Associative Property (10 min)

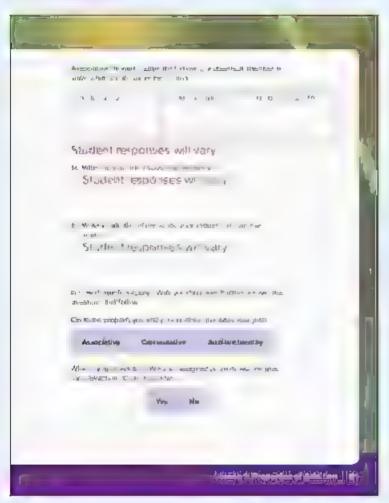
- 5 Repeat the process for the Commutative Property (Problems 5–10) and Associative Property (Problems 11-15). Make sure that students recognize the following
 - The Commutative Property of Addition states
 that advands can reflect the pin any order
 at the answer with the content of the same
 - The relative Principle of Adultur intesting a commission be produced in any way and the sum who reads to an e

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Student Page 61



Do the Properties Apply? (20 m n)



1. Ask students to discuss the following questions with their Shoulder Partner and give a Thumbs Up when they are ready to share



- Do you think these properties apply to subtraction problems?
- How can we figure out whether or not they do?
- 2 Cal. on students to share their trinking with the cass. Explain to students that they will be investigating to see if the properties of addition also apply to subtraction.
- 3 Ask students to turn to Lesson 1 Bull Do the Properties Apply? Point out to students the righter ne they may use to de p them so ve the problems, if needed.
- Assign each pair of Shoulder Partners a property (Additive identity, Commutative, or Associative) Each pair of students should do the following
 - If ghight or cacle their assigned property
 - Make a prediction about whether their assigned property applies to subtraction
 - Create a simple subtraction problem (Lsing numbers 0–10) to test their prediction
 - Draw a conclusion
 - Bip ain their conclusion
- 5 Give students time to work with their partner to complete their investigation

Lesson 1 . Properties of Addition



2 Using Addition and Subtraction Strategies

The second of th

- 6 When students are finished, ask volunteers to share their results. Students should see that these properties to not apply to sibtraction because, when the order of the numbers changes, the offerences are not equivalent to the differences of the original subtraction problem.
 - Examples
 - Additive dentity 6 = 0 = 6, but 0 = 6 aquals
 a number sess than 0
 - or Commutative 2 + 3 + 5 = 10 and 3 + 2 + 5 = 10 but 5 = 2 = 3 = 0 and 2 3 5 equals a number less than 0
 - Associative (2+3)+5 10 and 2+ (3+5)
 10 but (5 2) 3 = 0 and 5 (2 3) = 5

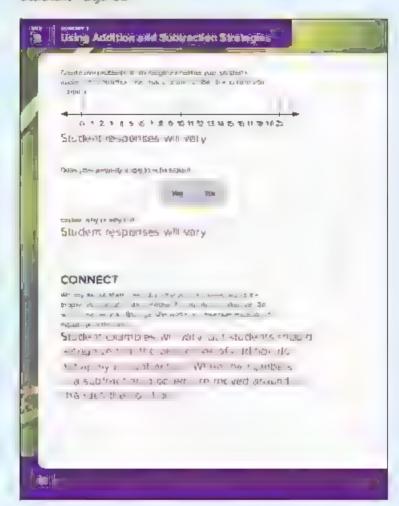
CONNECT (7 min)



Writing About Math

Direct students to Lesson 1 CON-NECT Writing About Math and ask them to respond to the prompt

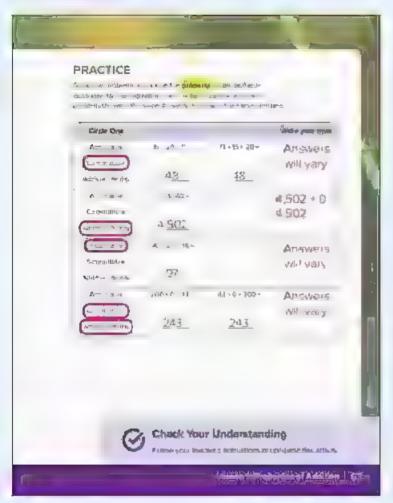
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Student Page 63



WRAP-UP (3 min)

Let's Chat About Our Learning

Ask student volunteers to share their responses to the Writing About Math prompt and explain their thinking Encourage students to ask each other questions and requestic anfication and examples

PRACTICE

Direct students to cesson 1 PRACTICE and have them complete the problems. Address student errors and m sconcept ons

Check Your Understanding

Solve the problems. Then list the property nustrated by each problem (Additive identity, Commutative, or Associative)

1 18 + 34 + 20 = 72

Reperty Commutative

2. (20 + 37) + 40 - 97

Property Association

3 56.248 + 0 = 50 -4

Property Additive (dentity)

4 50 + 12 + 8 - 70

Property: Commutative

Lesson 1 - Properties of Addition

LESSON 2 Review Mental Math Strategies

Lesson Overview

In this essen, students explore a variety of mental math strategies and discuss why it is important to be able to add and subtrect mentally. Rounding and estimation have a ready been explored, so to slesson introduces additional strategies. These strategies are referenced trivoughout the year as tools to help acive proparts mentally and assess the reasonable rest of computations, high students maintain a too kit of strategies by creating and displaying anchor charts they can reference over time.

Lesson Essential Questions

- Why is it important to be able to add and subtract imentally?
- Which mental math strategies are the most efficient?
- How can estimation help me so ve problems accurately?

Learning Objectives

In this lesson

- Students win apply a variety of strategies to add and subtract mentally.
- Students will explain the importance of mental meth skills

Grade-Level Standards

4.C.1.• Assess the reasonableness of answers using mental computation



Vocabulary Check-In

rbenchmark numbers, estimate, mental math,



Materials List

- Mental Main Strategies anchot chart
- Thinking like a Mathematician enclor chart



Preparation

Protocopy the Blackine Waster at the end of the volume.

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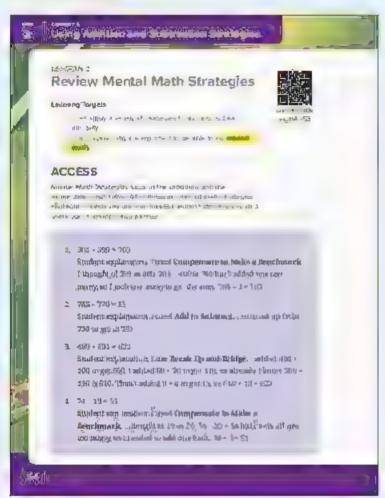
Review Mental Math Strategies



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Student Page 64



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

 When using compensation to mentally add and subtract, students are often uncear now to palance the amount compensated

Mental Math Strategies

- 1. Direct students to their Student Materials and ask them to read the Learning Targets for yessen 2.

 Ask students to share with a partner why they think mental materials important.
- Direct students attention to Lesson 2 ACCESS
 Mema Math Strategies. As a students to read
 the problems and the explanations of the mente,
 math strategies used by the students in the
 examples. This can be done thorally in partners, or
 independently.
- Ask students to right of circle the strategy that
 makes the most sense to them and share the r
 thinking with their Shoulder Partner.
- 4 Explain to students that they will be learning more about each strategy roday

2 Using Addition and Subtraction Strategies

BUILD (40 min)



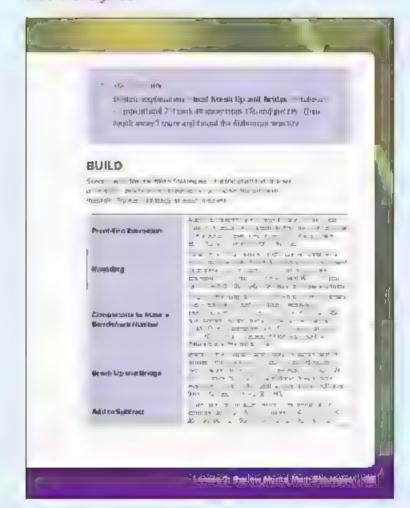
Solving with Mental Math Strategies

- 1 Display the Mental Math Strategies anchor chart Direct students to lesson 2 BULD So ving with Mental Math Strategies
- 2. Remind students that they have a ready practiced front-end estimation and rounding as mental math strategies, but that these strategies do not provide an exact answer.
- 3 Model and do a Think Aloud for the strategy Compensate to Make a Benchmark Number A suggested process follows
 - Review with students the definition of benchmark numbers. Students used benchmark numbers when they studied fractions in Primary 3.
 Benchmark numbers are "frendly" numbers that are easy to add and subtract mentally and usually include multiples of 10 or 100.
 - Record 37 + 8 on the board. Mode, as follows sompensating by subtracting 3 from the 8 and giving the 3 to the 37 to make a benchmark number (40)



• Which benchmark number should we make for 37) in other words, what number is 77 close to that is easier to add in our heards? (Most 1 e., it defines a language of the cents of the ce

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- How many Ones do we need to add to 37 to get to this benchmark?
- Where could get those 3 Ones?

Do a Think Aloud as you write the following on the board, explaining each step aloud Be sure to remind students that this strategy makes mental computation much easier



 What is the new problem we deated and what is the sum?

Explain to students that there is sometimes more than one way to compensate if a problem intowever, they must maintain balance and make sure the total does not change in other words, if we take from the number, we have to give to another. If we give to remainer if we give to remain another For example, they could have taken 2 from the 37 to make it 35, adding the 2 to the 8 to make 10. Both strategies work because they maintain balance and provide a correct answer.



 Do you trink we can compensate with subtraction? Why or why not?

Record 36 - 20 = and asi, students to so we the problem mentally and tell their Shoulder Partner the difference: Ask volunteers to share their thinking about the following



- Knowing that 36=20 = 15, what would the answer be if the problem is 36 - 197
- How do yet know?
- 4. Read the Break Up and Bridge strategy as a group. In this strategy, students break up numbers in addition; or subtraction problems to get partial answers, and then go back and addition subtract the missing quantities. Model the strategy and do a Thirly 4 out.
 - Write the problem 32 + 27 = _____ on the board
 - Explain that you are finding numbers in the problem that are easy to add in your head For example, 32 ± 20 = 52 (write on the board)
 - Then, you simply need to add the remaining 7 from 27. Write on the board: 52 + 7 50, so 32 + 27 59.

Lesson 2 • Review Mental Math Strategies

Using Addition and Subtraction Strategies

- 5. Model and do a Think Aloud for the strategy Add to Subtract in this strategy, students start with the subtrariend and add to get to the minuend. They then find the sum of the numbers they added to the subtrahend.
 - Write the problem 652 48 = _____ on the poard.
 - Explain that you input you can add 2 to 48 to get to 50, and then add 600 more to get to 650
 - 652 -48 50 + 2 652
 - You added 2, 600, 2 to 48 to make 652 Answer 652 -48 604

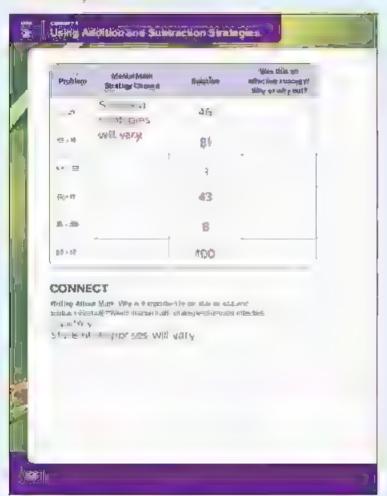
5¢ 652 -48 = 604

b. Display the Thinking Like a Mathematician anchor chart

- Regulard students that they had some practice with Thinking Live a Mathematic an in Primary 3. They will continue to discuss these ideas to develop a deep and flexible understanding of math. Using mental math strategies is about noticing the structure of numbers (7) to help, as well as using rules and patterns (8)
- Ask students to work with a partner to complete the table in their Student Materials (if there is not enough time left, ask students to complete the problems for homework. They should be prepared to discluss the strategies they used.) Explain that they might not a ways use all of the strategies, but good mathe naticians use multiple strategies and practices.
- 9 Review the answers as a class. Remind students that they may have selected different strategies from others. Some mental math strategies are better for some problems, and some mental math strategies are easier to use than others. Allow students to assigneethous. Clear up misconceptions as needed.



Student Page 66



CONNECT (7 min)

Writing About Math

Ask students to turn to Jesson 2 CONNECT Wrong About Math and respond to the prompt

WRAP-UP (3 min)



Let's Chat About Our Learning

Pase the for ewing all estions for group discussion. Use Ca .ing Sticks to hear from students



- Which mental math strategies are similar?
- How could these mental math strategies be combined?

PRACTICE



Direct students to besson 2 PRACTICE and have them complete the problems. Address student errors and misconceptions around very large numbers

Check Your Understanding

Decide which mental main strategy would work best for each problem. There may be more than one best answer.

Compensate to Make a Benchmark

Break up and Bridge

Add to Subtract

- 1. 169 + 32 Compensate to Make a Periman
- 2 902 789 Add to 5 lbt act
- 3. 64 # 89 Compensate to Make a Benchman
- 4 44 23 Break Up and Bridge
- So we two of the matching problems using the merital math strategy you selected.

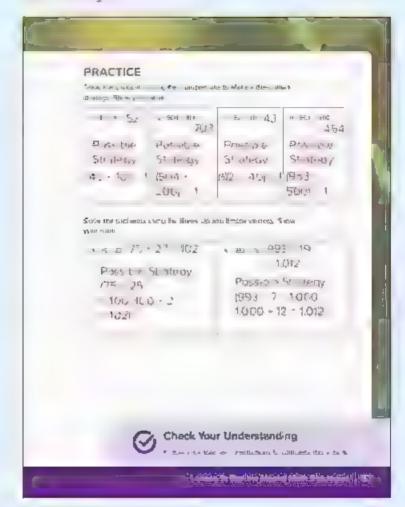
a tratege, come provide anomals a e

- 169 ± 3=, 164 ± 1, 4 ... = 23. 4 ...).*
- · BC (> B/+1 = 50) 40 722 3
- 64 # 89, 64 # (89 # 1) = 154 % 1 = 1 = 15.
- 44 '3 40=_1 | 20 and 4 3 1 5 14 . 1 11
- Selections of the mental math strategies. Write an addition problem showing how you use that strategy.

Ar swers well vary Act of the correct applications of the strategy

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Statemt Page 67







Materials List

No adolficha materials needed

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LESSON 3 Addition with Regrouping

Lesson Overview

In this lesson, students begin with an error analysis problem that reviews the identity Property and reinforces that it does not apply to subtraction. Students review and practice the standard a portion for solving addition problems with regrouping. Students should recognize that and the addition strategies they have learned are available for their use, though they may need additional practice with some of the strategies. Students also use rounding as a form of estimating to check the reasonable areas of their answers.

Lesson Essential Questions

- What are the different ways to add?
- Which addition strated as are the most efficient?

Learning Objectives

In this lesson

- Students will add multid git whole numbers
- Studients will estimate to determine if their answer is reasonable.

Grade-Level Standards

4.A.2.a Fluently add and subtract multidigit who enumbers

4.C.1. Assess the reasonableness of answers using mental combutation and estimation strategies including rounding



Lesson J · Addition with Regrouping

ACCESS (10 min)



COMMON MISCONCEPTIONS AND EPRORS

- Students may struggle with regrouping whether keing the standard argorithm or decomposing by place value.
- Students may always start a number line at 0. In properts that use range numbers, first important to start a number the with numbers other than "0

Error Analysis

- 1 Ask students to open to Lesson 3 ACCESS Enter And vais and complete the promahalysis problem
- 2. After students are finished, go over the problem as a class

Answer Key for Error Analysis:

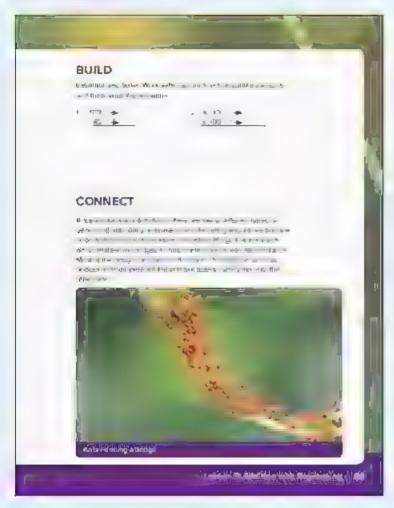
The next of an an weaddoor , the a tendent tendent tendent and the next from the section of the market the next tendent tendent to the section of the market the section of the factor of the section was the factor of the section of was the factor of the section of the section

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Student Page 69



BUILD (40 min)



Using the Standard Addition Algorithm (25 m.s)

- Expain to students that mental math strategies are halpful, butthey also need to know the standard algorithms for solving problems. An algorithm is a procedure or set of steps.
- 2. Write 465+221 vertically on the board. As students to help you solve the problem. If students do not remember the steps, remind them they have to start at the Ches place and ask them to solve 6 plus 1. Record / Repeat with the Tens place and the Hundreds place 687
- Ask voluntees s to summar æ in their own words the steps of the standard a gorttmifer adortion
- 4. Write 168+217 vertically on the board Agam, asil students to help you solve the problem. Ask if any students know what to do when there are 15 Ones in the Ones place. If no students remember regrouping, do the following.
 - Remind students that each place can only hold up to 9
 - Once there is a number greater than 9 in any prace, they must regroup
 - Ask students if they can make a Ten out of 15
 - Ask students where Tens belong Tay place
 - Model how to regroup 15 so 1 Ten is added to the Tens column and 5 Ones are recorded in the Ones place in the enswer
- 5 Continue to spive the problem with students' help 1.6%
- 6. For the remainder of this segment, practice solving additiona 2-3-, and 4-d git problems together, including problems with no regrouping, problems with one regrouping, and problems with two regroupings. Suggested problems, 56 ± 18 (74), 9,107 ± 362 × 40.07, 724 ± 66,211, and 5,918 ± 106 (6,021).

Lesson 3 . Addition with Regrouping



2 Using Addition and Subtraction Strategies

Estimate and Solve (15 min)

- Direct students to tesson 3 Butti Estimate and Solve Fell students they have a math superpower that cambelp them get correct answers every time. Their superpower is rounding. Explain that students can use rounding to essimate sums to see if their answer is reasonable.
- 2. Write 82 + 16 vart carly on the board. Ask students to round 82 to the nearest Ten (80). Then, ask students to round 16 to the nearest Ten (20). Ask students to solve 80 + 20 ments in Write the following on the board.

- 2. Explain to students that the est mate is 100, so we know the answer to 82 + 15 should be close to 100. Ask students to help you solve 82 + 16 (98)
- 4. Tell students that ance 98 is close to our estimate, we know dur answer is reasonable.
- 5 Asi students to work with their Shot, der Partner to solve Problem 1" in their Student Materia's. After a couple of minutes, go over the solution together

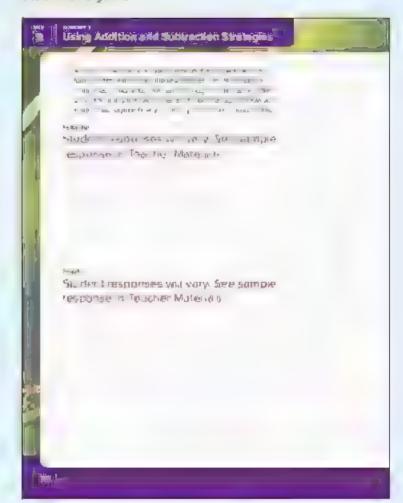
TEACHIP INDVERTINATION OF THE CHIP INDVERTINATION OF SHEET SHEW THE CHIP INDUSTRIAL CH

 Have students work with their partner to solve Problem 2 if time allows. Go over the solution together

Answer Key for Estimate and Solve:

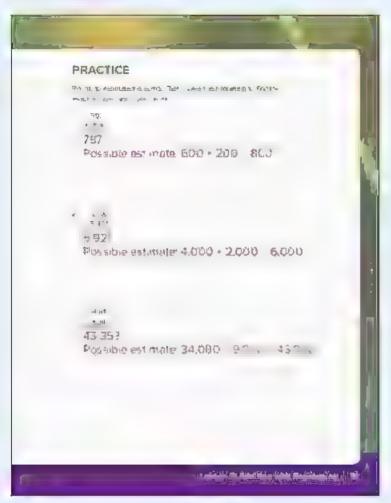
- 1. If students rounded it is then by 1. If a new exciter 640 if students for a single time of the exercise the horse than a rounded to the new estimated and out to the new estimates.
- I for terms pounded both addedoned a tome sentent tended a the added to the added by the reaction and the reaction and the reaction and the research thousand a 400 per and a 100 per an

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Student Page 7.1



CONNECT (7 min)



Bridging Ants and Addition

- 1 Ask students to take to Lesson 3 CONNECT Bridging Arits and Addition, Ask volunteers to take turns reading award portions of the information about arits
- 2 After reading, ten students that scient stalare so impressed with the natural algorithm these anti-use to create bridges that adentists are studying them to help companies design smarter "repotic swarms" to deliver packages by allones.
- 3. Ask students to work independently to so we the problem related to antituridges. Remind students to respond to a liparts of the problem.

Answer Key for Bridging Ants and Addition:

1 147 + 155 307 Post est wites 150 + 20 | 30 | 40 + 170 | 17

WRAP-UP (3 min)

Let's Chat About Our Learning

- 1 Asir students to Turm and Tall to their Shou der Parmer about which strategy they used to solve the problem and why they chose that strategy
- 2 After a minute, ask students to share their thinking with the dass



2 Using Addition and Subtraction Strategies

PRACTICE

Direct students to besson 3 PRACTICE and have them complete the problems. Address student errors and imisconceptions

Check Your Understanding

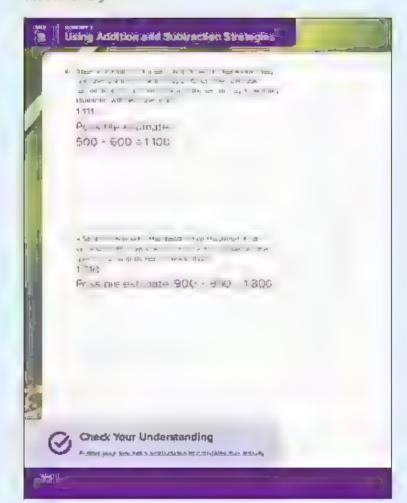
Complete the chart be ow

	Ant Species Totals					
	5pecies	Total	Round Each Number to the Nearest Thousand			
1	Black Garden Ans	\$8,712	59,000			
2	Pavement Ants	81,475	81,000			
ä	Pharach Anto	42,358	42,000			

4. How many ants would you have if you combined the pharach arts and the pavement ants? use your rounded numbers from the table to est mate and then find the exact answer.

What is the total amount of ants? Use your rounded numbers from the table to estimate, and then find the exact answer.

PRINT







Materials List

- Miental Math Strategies anchot dhata
- Thinking Like a Methernerwish anchor than



Preparation

Prior to the esson, and the strategies Counting Back with Decomposition and Counting Up with Decomposition to the Mental Math Strategies anchor draft.

DIGITAL



Subtraction Strategies



⊊g/πt4055

LESSON 4 Subtraction Strategies

Lesson Overview

in this esson, students begin with a Number Tark to help them mentally solve addition preplems, humber Talks require students to think deeply about problems without pendi or paper in dider to better develop their marriber sense and flexion by with solving problems thathematically. Students then use detampos bon of mambers to subtract.

Lesson Essential Questions

- What are the different ways to subtract?
- Which subtraction strategies are the most efficient?

Learning Objectives

In this lesson

- Students walkise decompos you of numbers to subtract multidigit whose numbers
- Students will explain the importance of finding. patterns and relationships in mathematics

Grade-Level Standards

4.2.A.a Fluently add and subtract must short whole numbers

4.C.1. Assess the reasonableness of animums using mentāl combutation and estribation strategies including rounding



Vocabulary Check-In

difference, minuend, subtrahend

Lesson 4 • Subtraction Strategies

ACCESS (10 min)



COMMON MISCONCEPTIONS AND EPRORS

- Students may struggle with decemposing muribers in meaningful ways (ways that make sense to them).
- Students may struggle with where to place numbers on an open number line.

Using 10s

FACTOR MOTE I ad a dual on the party and in a management of them and half them are to show their ear onsets with them are to show their ear onsets with them are to show their ear onsets with them are to show their ear onsets and not the policy of owe ad students to real and not for you to see quickly who a thing dual the communication strategy of half a party of the early of the communication strategy of half a party of the set of the s

- 1. Explain to suidents that using 10s facts is a helpful strategy to use with addition problems, introduce the Number Talk by explaining to students that they will look at some addition problems. When you give the agnal, they should try to solve them mentally using 10s as a benchmark, or friendly number
- 2. Have students turn to Lesson 4 ACCESS using 10s
- 3. Direct students to solve Prou arms 1–3 mentally and give a Thumbs Up when they know the answers Give students about 30 seconds to solve the problems
- 4. Call on several students who have their thumbs up and record their answers on the board. Ask students to explain how they used 10s to solve the problems. Record students' thinking on the board and encourage students to ask each other questions.
- 5 Repeat the process with Problems 4-6 and then 7-8
- Ask students to discuss how they could use 100s in the same way to make mental addition easier

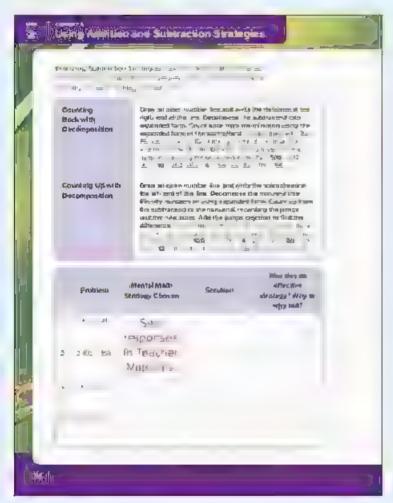
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Student Page 74



Answer Key for Using 10s:

- 1 10
- J 15 7 # 3 10 10 # 5 · 15
- 1 + 4 € 10, 10 + 6 = 16 or +1 from the previous
- J 10
- 5. 17 (9 m % = 1.0, 10 4 7 m 1 1)
- 6. 16 (9 + 1 = 10, 10 + 6) 10 or -1 from the presidu.
- 7 $20.67 \pm 3 = 1.0, 10 \pm 10 = 20 \text{ or } 10 \times 2 = 10$
- 3 20 (9 + 1 = 10, 10 + 10 = 20 cm 10 x 2 = 20)

BUILD (40 min)



Subtraction Strategies (20 mm)

- 1 Ask students to charally read today's Learning Targets
- 2 Ask students to turn to Lessur 4 BU LD Subtraction Strategies and solve Problem 1 using the subtraction strategy they prefer

Answer Key for Subtraction Strategies:

1 3 8

- As a few students to share their subtraction strategles with the class. Record students the king on the board. Display the Mental Math Strategles anchor chart of it is not already displayed) and add ally new strategles students describe to the anchor chart.
- 4. Mode Counting Back with Decomposition and Counting Up with Decomposition and add them to the Mental Math Strategies anchor chart

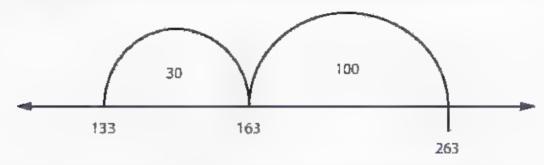
Lesson 4 · Subtraction Strategies

Counting Back with Decomposition

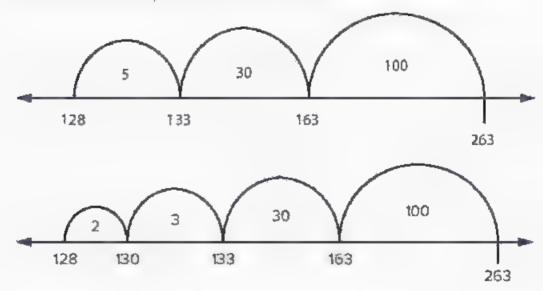
- Write 263 = 135 = _____ on the board
- Draw an open number me. Write the minuerid (larger number in a subtraction problem) at the right end of the number line



- Do a Think Alcaid as your break the subtrahand (smaller number in a subtraction problem) Into expanded form, 100 # 30 + 8
- Mode, how to move backwards on the number line using the numbers from the
 expanded form of 135. The example shows the numbers from the decomposed
 subtrahend above the number line. The differences are recorded below the
 number line.



 Attract point if the problem, you can either model subtracting the 5, or you can make it even simpler by decomposing the 5 into a 3 and 2. The two options are shown in the example





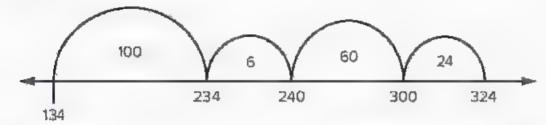
Counting Up with Decomposition

- Write 324 134 –
- · Draw and the art write the subtranent of the far of the number one

on the board



Do a Think Aloud as you count up to make the mirruend, recording your jumps above the number line and the sums below the number line. An example is shown



- Experin to students that they can count up with any combination of members
 ("jumps") as long as they reach the minutent. They should use numbers that are
 friendly to their.
- Mode how to add the numbers above the numbers he to find the difference batween 324 and 134, 190

Lesson 4 • Subtraction Strategies

Exploring Subtraction Strategies (20 mm)

- Ask students to turn to sesson 4 Bus D Exploiting Subtraction Strategies and work with a parties to solve findeless 1-4. Explain that they thight not always use all of the strategies on the anchor brain that good mathematic ansuse mult ple strategies and practices.
- 2. After 12–15 minutes, review the answers as a class. Ask students to share their thinking about the strategies they used and allow them to ask questions. Clear up misconceptions as needed.

Answer Key for Exploring Subtraction Strategies:

- 1 100
- 3 460
- # 40

CONNECT (7 min)



Writing About Math

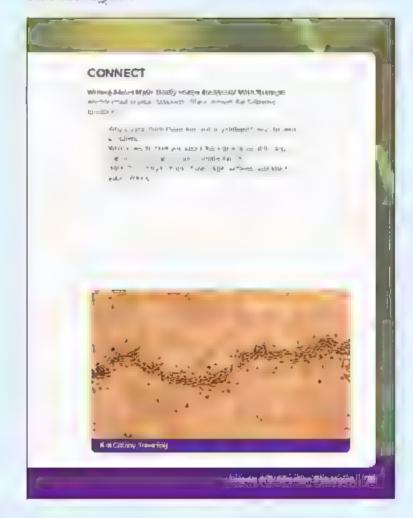
- Direct students to bessen 4-CONNECT Writing About Wath and read the prompt aloud
- 2 "Give students 5—6 minutes to respond to the questions

WRAP-UP (3 min)

(P) Let's Chat About Our Learning

1 Ask volunteers to share their Writing About Math responses. Encourage students to ask each other questions

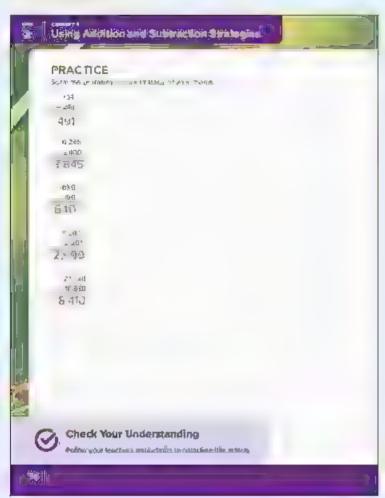
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Student Page 76



PRACTICE

Direct students to Lesson 4 PRACTICE and have them complete the problems. Address studentierrors and impropertions

Check Your Understanding

Sowe the problems using a strategy of your choice.

- 1 8,497 1,246 = 251
- 2. 1.325 920 40E
- 3 310-406 = 204
- 4. 10.000-350-9.450
- 5 766-564=201

Mental Math Strategies

Add these strategies to the Mental Math Strategies arichor chart

Counting Back with Draw an open number line and write the minuend at Decomposition the right and of the line. Decompose the subtrahend into expanded form. Count back from the minuend using the expanded form of the subtrahend. For example, with 312 - 116; you can write 312 at the right and of a number line and then break 116 nto 100 + 10 + 6 Count back on the number line using the exganded form 312 100 = 212; 212 - 10 = 202; 202 6 196 5p. 312 116 = 196 Counting Up with Draw an open number line and write the subtrahend Decomposition at the left and of the line. Decompose the minuend into friendly numbers or using expanded form. Count up from the subtrahend to the minuend, recording the jumps and the new sums. Add the jumps together to

- 198 Sc. 312 116-196

find the difference. For example, with 312—116, you can write 116 at the left end of a number line, and then make "finencilly" jumps to get to 312: 116 ± 100 ± 216, 216 ± 4 ± 220 220 ± 80 = 300, 300 ± 12 = 312, 100 ± 4 ± 80 ± 12





Materials List

- Place value chart showing Thousands and Ones periods
- Subfraction strattegy signs



Preparation

Draw a place viewe charton the board snowing Thousands and Ones periods. In large writing, abelifour sheets of paper with a subtraction strategy:

- Standard Subtraction Algorithm
- Counting Lp with Decomposition
- Counting Down with Decomposition-
- Other Strategy

DIGITAL



Subtraction with Regrouping



Quick Code eqrit4056

LESSON 5 Subtraction with Regrouping

Lesson Overview

In this lesson, students review and practice the standard alignrithm for subtraction, drawing place value representations to help support the decomposition of each place into smaller units.

Lesson Essential Questions

- · What are the different ways to subtract?
- · Which strategies are the most efficient?

Learning Objectives

In this lesson

- Students will use place yours to subtract using the standard algorithm
- Students will subtract with regrouping
- Students will est mate to their decreasonableness of their answers

Grade-Level Standards

4.A.2. Filently add and subtract multi-digit whole numbers



Vocabulary Check-In

a gorithm, regroup

Lesson 5 - Subtraction with Regrouping



ACCESS (10 min)



COMMON MISCONCEPTIONS AND EPRORS

- Students struggle to understand the standard argetithm for subtraction when regrouping is required. They do not decompose into smraller units to solve.
- Students tend to mode both the subtrahend and militarid instead of recognizing that the minueral is the only number to model since the subtrahend will be taken away from that larger number

Error Analysis

- The Ask stadents to turn to Lesson 5 ACCESS Error Analysis and complete the error analysis
- 2 Go over the answers as a class

Answer Key for Error Analysis:

the entered of the streets explain that, a thought we to desire the surpless of the surpless o

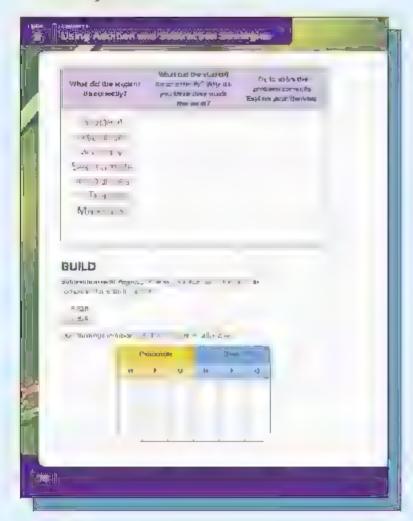
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Standent Page 77





Student Pages 78-80



BUILD (40 min)





Subtraction with Regrouping (15 m n)

1. Ask students to turn to Lesson 5 Bu . D Subtraction with Regrouping. Ask students to use the prace value chart in the riproces to made, the number 3 328 using images for Ones, Tens, mundreds, and Thousands to represent the number in each place. An example is shown. As students are working, draw a model on the board where all students can see it.

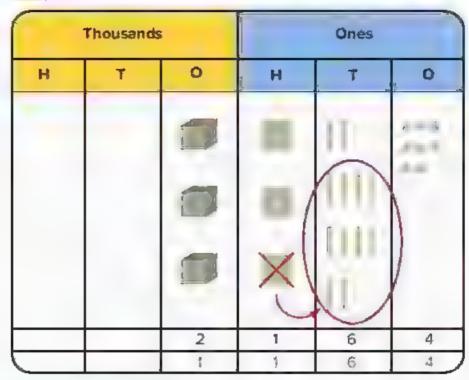
Thousands		Ones			
Н	T	0	Н	T	0
				1	
			10		

- Ask students to explain why they would only need to mode the minuend and not the subtrainend that the first somether or is the region of the subtrainer of is the region of the subtrainer of is the region of the subtrainer of the region of t
- 3 Use your mode, to review the process for using the standard subtraction algo ithin with regrouping, asking students to provide the steps whenever possible. Asking estions to help guide students thinking. Sample questions are given.
 - Loor at the mode for 3,328. We want to subtract 2,164 from 3,328. Are there any places values where we will need to regroup? Teris
 - Do we have enough Ones? Yes Terrs? No Humareds? >> The year os? Yes

Lescon 5 - Subtraction with Regrouping

Using Addition and Subtraction Strategies

Is there a place where we need to "take away" more than we have available?
 Ters place.



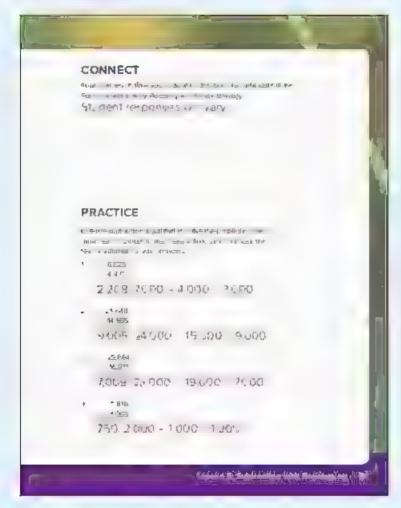
Ant Facts and Algorithms _ [m n]

- 1 Ask students to turn to Lesson 5 BL/LD Ant Facts and Algorithms. Ask virtunteers to read the paragraphs aloud
- 2 Ask a volunteer to read Problem Taloud, and then direct students to record an equation for the story
- 3 Ask for a volunteer to write the equation on the board (vertically) while students check to make stire they have written the correct equation
- Ask the volunteer to first estimate the difference by rounding each number to the nearest Thousand. The student should record the problem and estimate or the board Ask students to check their estimates and make corrections, if necessary
- 5 Finally, have the volunteer return to their seat and ask a students to solve the problem independently using the standard algorithm, and recording their answer in the Student Materials
- 6. When students are finished solving Problem 1, ask a volunteer to solve it at the board modeling subtraction with regrouping and the standard subtraction algorithm. Seated students should check their work and correct any errors.
- 7 Model how to compare the estimated answer to the actual answer to check the reasonableness of the final difference.
- 8. Repeat the process for the Propiems 2 and 3



PRINT

Student Page 81



Answer Key for Ant Facts and Algorithms:

CONNECT (7 min)



Four Corners

- Place signs listing the following strategies around the room
 - Standard Subtraction Argor thm
 - Counting Down with Decomposition
 - Counting up with Decomposition
 - Other Strategy
- Ask students to stand by the strategy that they prefer to use when subtracting. Emphas as that there are multiple ways to subtract, so any students who do not prefer one of the practiced strategies should stand by the card that says Other Strategy.
- 3 Ask students to share in their comer groups why this is their preferred strategy.
- A Asy, students to return to their seats and turn to Lesson 5 CONNECT Four Corners to record their preferred strategy

WRAP-UP (3 min)

Let's Chat About Our Learning

- 1 Ask a few volunteers to share their thinking with the whole group
- Ask saudents to discuss why they trank they are earning so many addition and subtract or strategies.

សុរុស្ថេច ខណ្ឌការ គេក្រុស ស្វេស ស្វេស ប្រទេស ប៉ា ស្ ា សុស្ថិ ហា, ពាភា ស ព្រះ ជា !! ឯកមានសិត្សាសុស ្រុស្សា កាន់ ១ ១ ១ ស្វេស សុ ប៉ាស្សាស៊ី កែសស ស្រែស ប្រសាស ស ស ស ស ស ស្រុស ទៅ និងស ស ស្រែស

Lesson 5 - Subtraction with Regrouping



PRACTICE

Direct students to besson 5 PRACTICE and have them complete the problems. Address student errors and misconceptions.

Check Your Understanding

1 Lise the standard subfraction algorithm to solve the problem. Then, round each quimber to the nearest. Thousand to check the reasonableness of your answers.

13,526 2,834 = 10,692, 14,000 3 000 = 11 000

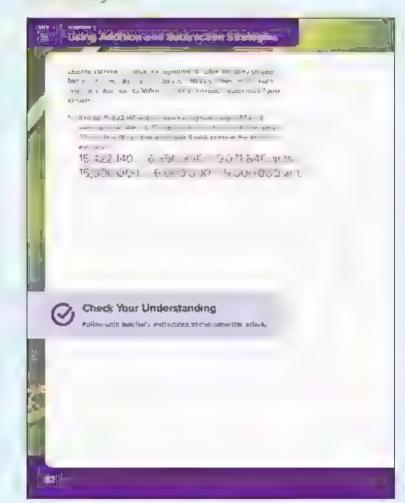
2 Use the standard subtraction algorithm to solve the story problem. Record your equation and show your thinking. Then, round each number to the nearest Hundred to check the reasonableness of your answer.

A local bakery sold 1,232 zalabya in one day if they sold 876 zalabya in the morning, how many were sold during the rest of the day?

So,ve the following problems using the standard subtraction algorithm. Then, cound each number to the nearest Thousand to check the reasonableness of your answers. You may draw a place value chart to organize the problems, if needed

- 3 17,525 13,708 = 3817, 18,000 14,000 4,000
- 4 431 925 204,835 4 1 TONU 40 040 DUT NO.
- 5 61.851 52 670 = 7 51 6.769 53,000 = 9,000

PRINT







Materials List

Materials may vary

DIGITAL



Concept Check-In and Remediation



Ou ck Code egmt4057

Concept Check-In and Remediation

Lesson Overview

In this esself, students work to connectum sconceptions and errors from Concept 1 using Addition and Strategies First, administrative Concept Cheef in Once you have reviewed the quilibraries. Choose remediation activities based on the needs of your students. Some recommendations are steel below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or in a small group with the teacher

Lesson Essential Questions

- Do the properties of addition apply to subtraction?
 Why or why not?
- Why is it important to be able to add and subtrest mentally?
- How can estimation help to so ve problems assirate y?
- Which addition strategies are the most efficient?
- Which subtraction strategies are the most efficient?

Learning Objective

in this esson

 Students will work to correct in sconceptions and errors related to using addition and subtraction strategies

Grade-Level Standards

- 4.A.2 Use place value understanding and properties of operations to perform multi-digit arithmetic
- 4.A.2.a Figerity add and subtract multi-digit who simples
- **4.C.1.d** So, ve multi-step word problems posed with whole numbers using the four operations, no uding problems in which remainders must be interpreted
- **4.C.1.** Assess the reasonableness of answers using mental computation

Concept Chack-in and Remediation



Vocabulary Check-In

Review concept vocabulary as needed-

COMMON MISCONCEPTIONS AND ERRORS

- Students may not understand that, almough the order of numbers obes not made in an addition problem, it matters greatly and shanges the answer with a subtraction problem.
- Students may struggle to remember the difference between the Associative and Committee Properties
- When seing compensation to memory add and subtract, students are often unclear how to be an on the amount comparisated,
- Students may struggle with regrouping whather "Lang the standard algorithm or decomposing by place value
- Students may struggle with decomposing numbers in meaningful ways (ways that make mental math easier).

1f...

Students do not understand that the order of numbers does not matter in an addition problem, but it does matter greatly and changes the answer with a subtraction problem.

Then...

Review Do the Properties Apply? from Lesson 1. Consider having students "test" the properties using man puratives and small numbers. Ask students to discuss their findings when they change the order of the numbers (and manipulatives) in the problems.

Han

Students are strugging to fluently add or subtract multidigit bumbers

Then...

Review Lessons 3 and 4. Consider halving students use place value charts to help organize their problems and visualize what they are doing when they add and subtract is hightnessendand a gor think of possible have students work with a partner who is fluent so the partner can offer support and quidance.

If.

Students strug the tor-funderstand the standard algorithm for subtract, on when regrouping is required. They do not decompose into sinaller tinus to solve

Then...

Review Subtraction with Regrouping from Lesson 5. Consider the plant students practice 3- and 4-digit addition and subtraction using base ten places. Mode for students how to regroup by exchanging a hundred for 10 lens has Ten for 10 Ones for some students, plays cally regrouping the manipulatives can help them visualize what is happening when they use the standard algorithm. It plass be have students work with a partner who is fluent so the partner can offer support and quidance.

Concept Check-in and Remediation



If...

Students struggle to understand how compensation works and do not remove or add the appropriate amount to find the actus answer.

Then...

Practice Compensation using beans to concretely mode the strategies

- by Hand out dups of beans or counters (one cup per two students with 60-70 beans, if possible)
- 2 Mode Looking for Compatibles (as ng the beans)
 - Pose the following problem
 37 + 8 -
 - Students make a bile of 37 beans and a pile of 8 beans Asrithem to move 3 beans from the 8 to the 37 maxing 40 and then students can see that the sum is 45
 - Repeat with another problem
 sing small numbers and
 stress no that that no a
 Benchmark 10 or 100 or a
 1,000 is he pits when mentally
 adding because they are using
 a Benchmark number that is
 easy to add mentally
- 3. Mode Compensation for Addition and Subtraction Lamp the beans
 - Addition Ask students to make a pile of 29 beans and a pile of 15. Ask students to whisper the sum.



- What is the sum of 30 and 157 (have students try to solve mentally.)
- How is this problem sim far to 29 ± 15?
- How can so ving 30 ± 15
 help us so ve 29 ± 15?

- Expirity state that since
 one bear was aided to the
 second problem the sum of
 the first is one less. Point out
 the strategy on the anchor
 chart and read through the
 example together
- Repeat with a few more examples such as (28 # 13 49 + 24) use the beans to reinforce that adding one or two to one addend means having to subtract one or two from the actual such.
- Subtraction Ask students to make a pile of 36 beans Ask them to subtract 20 and whisper the allower



- What would the answer be if only 19 bears were removed?
- Why?
- Have students physically ramque 19 to find the new difference
- Practice with auditional problems modeling companisation and having students share what they notice

Concept Check-in and Remediation



Selving Multistep Problems



Concept Overview

In Concept 2: Solving Multi step Problems students leview and explore multistep preblem-solving strategies, including math modeling strategies. This work he papere them for working with larger numbers and provides contextifor the importance of estimating to check the reasonableness of answers. Although instruction in solving multistep problems continues throughout the course, students focus on fluetry of addition and subtraction problems and solving word problems using four functions.

Concept Standards

- 4.A.2.a Fluentry and and subtract multi-digit whole numbers
- 4.A.2. I ustratie and explain calculations tising equilitions or models
- **4.C.1.d** So ve multistep word problems posed With whole gumbers as highlige four operations, not iding problems in which remainders must be interpreted
- 4.C.1.d.1 Use etters in equations to represent unknown quantities

Concept 2 Solving Multistep Problems

Concept Planner

All lessons are designed to be 60 minutes. The materials tisted in this chart are items to gather for each group. Items for the class or for individual students are indicated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
Bar Models, Variables, and Story Problems	• No additional models are needed	Bar model Varietive	Students will use letters to represent unknown quantities in equations Students will use bar models to represent and solve story problems Solve for the variable in an equation
7 Solving Multistep Story Problems with Addition and Subtraction	- Thinking Like a Mathematician anchor chart	Review wocabulary as needed,	Students will solve multistep story problems Students will explain how they solved multistep story problems
Contest Check-th and Remadiation	Materials may vary	Review concept vocabulary as needed.	Students will work to correct miscorrespt one and errors related to solving multistep problems

Opportunities for Assessment:

in addition to the assessment opportunities included in this chart, each concept will include a Concept Check-in.

Common Misconceptions and Errors	Opportunities for Formative Assessment
 Students struggle to determine what a variable represents and how to find the value: Students may not demonstrate flex bill ty in how they find a variable in a fact family. They may not be able to see that there are several relationships between the other numbers. 	Bar Modele, Solving Equations with Variables, Writing About Math, Fractice, Check Your Understanding
 Students often confor reywords to indicate which operations are needed to some story problems. However, reywords do not always work. Students may not be able to formulate or implement a plan for solving multistep problems. Students may not realize there is often a "hidden" question they must answer before they can solve multistap problems. 	Putting it Together Sowing Multistep Story Problems, Writing About Math, Practice, Check Your Understanding
 Students rijay struggle to detarmine what a variable represents and now to find the value Students often look for keywords to indicate which operations are needed to solve story problems. However reywords do not always work Students may not be able to formulate or implement a plan for solving multistep problems. Students may not realize there is often a "moden" question they must answer before they can solve multistep problems. 	Coarept Checran

Concept 2 Solving Multistep Problems

LESSON 6 Bar Models, Variables, and Story Problems

Lesson Overview

This resson combines opricepts students have explored in the attent—bar models, variables and stoly problems. Students apply the manufection of each element to invest gate the importance of maintaining to each element in aquations. Students use bar models to identify the unknown information, a story problems, create equations to represent the mathematics in story problems, and solve to find the unknown. Because there is an inverse multiposing between addition and subtraction, some attains may use subtraction to some the preparents, while others will use addition Both approaches are valid as englas the interpown is found and the equation remains balanced.

Lesson Essential Questions

- What are the different ways to add and subtract?
- Which strategies are the most efficient?
- How/can estimation help me some problems accurately?

Learning Objectives

In this lesson

- Students will use letters to represent un known quantities in equations
- Students will use bar models to represent and solve story problems.
- Students will selve for the variable in an equation



Materials List

No additional materials needed



Preparation

Ne additional preparation meeded

DIGITAL



Lesson 6

Bar Models, Variables, and Story Problems



Quick Code egmt4058

- 4.A.2.a Fluently and and subtract multi-digit whole numbers
- 4.A.2. ustrate and explain ca c. at bis using equations or models
- 4.C.1.d So ve must estep word problems posed with whole numbers using the four operations whoulding problems in which remaineds must be interpreted
- 4.C.1.d.1 Use etters in equations to represent unknown quantities



Vocabulary Check-In

bar mode, warrable

Lesson 6 - Bar Models, Variables, and Story Problems

2 Solving Multistep Problems

ACCESS (10 min)



COMMERCINES 'S FREEDRICK STREET,

- Students may sin, ggle to defermine what a variable represents and how to find the value
- Students may hot demonstrate flex bity mow they find a variable in a fact farmly. They may not be able to see that it are are several relationships between the other numbers.

Introducing Variables

1 Ask Students to stand and show with the rood es now something polis when in parance

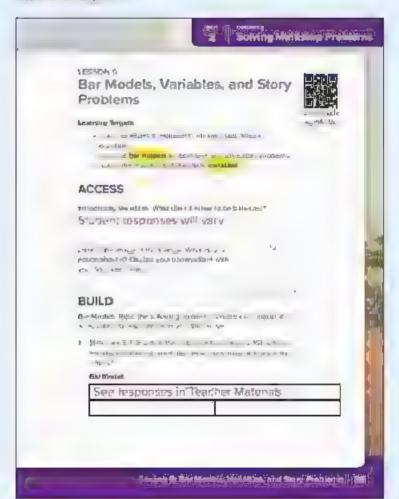
TEAC SERVINOTE THE GLOSS OF THE COMMENT OF THE SERVINOS OF THE

- 2 Ask a few volunteers to share their ideas. Reinforce that belance means the same (equal) on both sides.
- Ask students to turn to Lesson & ACCESS
 Introducing Variables and box at the triangle on
 the page. Then, ask students to share with their
 Shoulder Partner what they notice and wonder
 about the triangle.



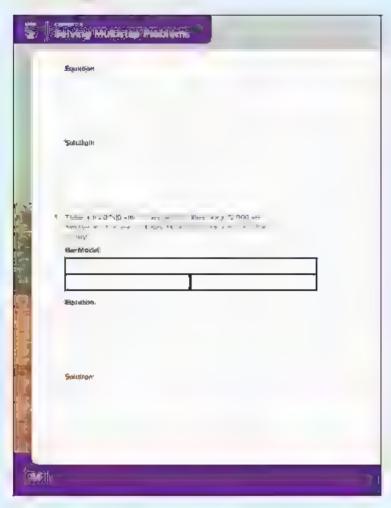
- 4. After 1 minute, ask wounteers to share with the whole class what they notice and wonder Reinforce the following:
 - The numbers are a fact from ly
 - The letter prepresents an unknown humber
 - The letter picture represent several options depending on how this problem is interpreted

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Student Page 86

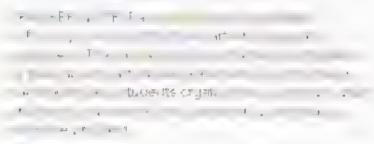


- o pleased = 4 if this were multiplication /division
- o posted = 15 or 9 if this were addition/
- 5 Remind students that in Primary 3 they saw unincomnumbers as a box or symbol, introduce the term variable and explain that a variable is a symbol that is a placeholder for a number. In Primary 4, they will use letters as variables to represent in sand numbers if equations

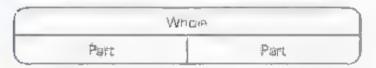
BUILD (40 min)



Bar Models 🚅 🕩 🗥



- Ask students to turn to Lesson & B.J. D. Bar Mode's and chorally read the Learning Targets. Then, ask a volunteer to read Problem 1 a public.
- 2 Draw a par mode, and abe, it as shown. Remind students of the par modes they used in Primary 3 to represent part-whole relationships



3 Ask students to check the problem and answer



- What is the whole? 5,326
- What is the known? 2.164
- What is the unknown? That is
- 4. Record 5,328 as the whole, and 2,164 as the known part as students labe, their own part model in their Student Meterials. Explain to students that they can label the unknown part with a letter, and that this time you will use the letter x. Make sure students understand that choosing a different letter does not change the value of the variable.

Lesson 6 - Bar Models, Variables, and Story Problems

2 Solving Multistep Problems

	5 328		
210	:4	Х	

- 5 As students to talk to their Shoulder Partner about how they in ght solve the problem. Remind students they can try to use any of the strategies they have practiced in previous lessons.
- in tuse Calling Sticks to hear from 2 to 3 students. Once the first student has spared their thinking ask if any students used different strategies. Ask them to explain and demonstrate now they found their answers.
- Ass students to complete Problems 2-4 in the Student Materials. Caution students that some problems are worded differently, so they should read them carefully.

8 After about 1.0 m mates, go aver the answers to the processors. Help students clear up any misconcept one and correct errors.

The Mer Mode is accepted constrons on equations that house the consent whose imposer part and a substitution that the series in the entropy part. Since there is a solution that the series is a consent of the series in the entropy of possible in the entropy of the

Answer Key for Bar Models:

1

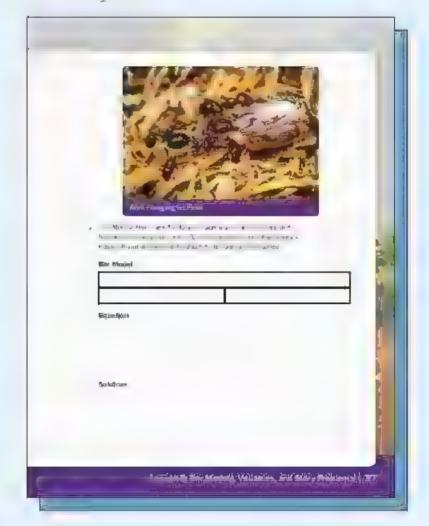


5 TB 2164 = 3 3164 + 3 = 5 × 6 5 K.E. 5 1.4 ± + 1.14 = 5 × 5

1 : 164

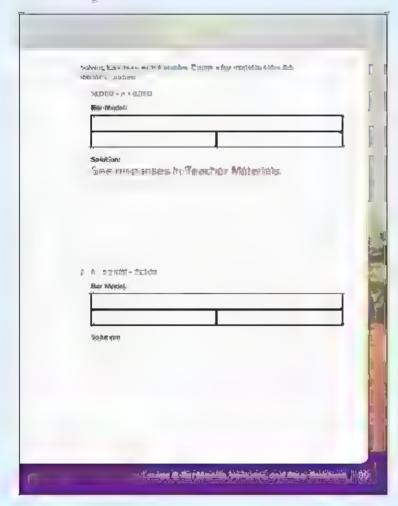
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Student Pages 87-88



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Student Page 89



2



20 0)0 =12.)08 - h

b = 8.800

3



1,280 - 1. . . .

4



= 2,000 - 2,500 = d

depend

Solving Equations with Variables (20 mm)

- 1. For students that sometimes we have to solve equations with variaties without the gontext of a story problem However we have a too intifut of addition and subtraction strategies to help us to he about what is known and what is unknown.
- 2. Direct students to turn to Lessor & Burillo Solving Equations with Variables and look at Problem 1. Write 14,000 n | 6,000 on the board and ask students to discuss what the n represents in the equation. The unimprove
- 3. Ask students to Turn and Tall to a partner about how they would find the value of n
- Use Calling Sticks to select 2 to 3 students to share their thirtying
- Ask students
 - . What is whole in this problem?
 - What is the known part in this problem?
 - What would the bar model lack like for this problem?

Lesson 6 - Bar Models, Variables, and Story Problems

2 Solving Multistep Problems

Draw a blank bar mode, on the board and ask a volunteer to record the whole and the known part

- How can you check if your answer is correct?
 If it not mer housed, mode, that students can
 ent the north by replacing the upunownian
 the north in the solution to see it
 into the whole
- 6 Ask students to complete the rest of the problems in the Student Mater as (either independently or with a partner)
- When there are a few minutes left, review the arrowers and clarify any misconceptions or wrong answers

Answer Key for Solving Equations with Variables:

1

1	4,090
6 000	#1

n = 0.000

2



ef = 21.700

3



100-120

4

	1 3 63		
 K		d	

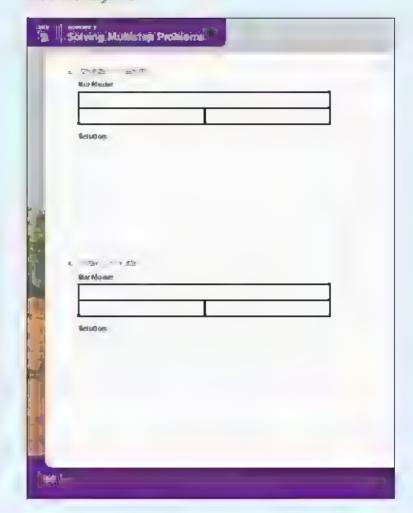
3 27 (

5



604 s 5

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Student Page 91



CONNECT (7 min)



Writing About Math

- 1 Tell students that they will be writing a story problem to check their own understanding of part who e story protherus
- Ask students to funi to Lessor & CONNECT Writing About Math and read the prompt aloud. Make sure students understand the directions, and then have their begin working independently to respond to the prompt.

WRAP-UP (3 min)

Trade and Solve

- "I. Ask students to trace their Student Materia's with their Shoulder Faither and solve each other's story problem
- 2 If time allows, students should theck each other's work

Lesson 6 • Bar Models, Variables, and Story Problems

2 | Solving Multistep Problems

PRACTICE

Direct students to 'Lesson & PRACTICE and have them complete the problems. Address student errors and Intraconceptions

Check Your Understanding

Answer the questions. Show as of your work

Seth took some steps on Monday, He walked 10,075 more steps on Tuesday Now Seth has a total of 78,200 steps in owl many steps did he take on Monday?

	78,200	
10.075	d	

Equation: 79,200 10.075 at

Solution: a - 68,125

2 152.350 = c + 42.125



Տերկերո . 11, 1

3 2 10,780 - 101 375

	h.		
10 130		12125	

Solution, z = 112,155

4. 425 4 d = 15,000

	1500		
415		d	

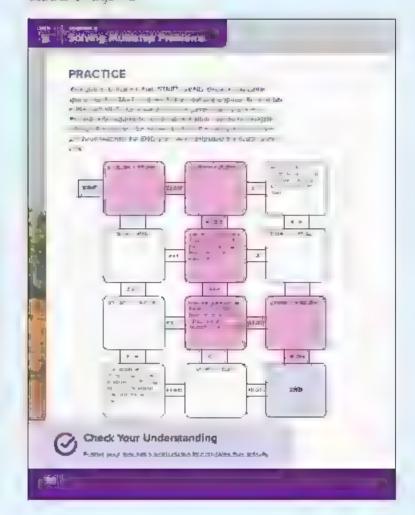
Solution of = 14 575

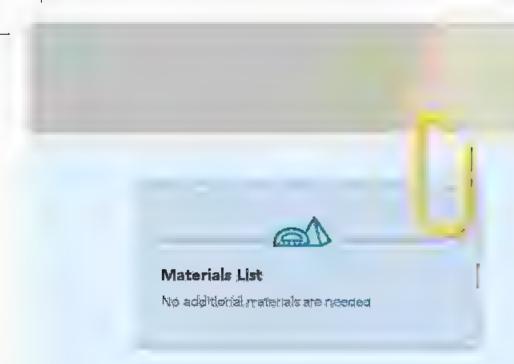
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Solving Multistep Story Problems with Addition and Subtraction



egint#059

LESSON 7 **Solving Multistep Story Problems** with Addition and Subtraction

Lesson Overview

in this esson, students focus on the strategy of finding the "broideth" quest too in murtistep story problems They solve and explain the steps to solve multistep story problems with addition and subtraction.

Lesson Essential Questions

- What are the different ways to add and subtract?
- Which strategies are the most efficient?
- How can estumption help the so ve problems actionate y'

Learning Objectives

in this lesson

- Students will some multistap story problems.
- Students will explain how they solved multistep. sterry problems

Grade-Level Standards

4.C.1.d Salve multi-step word problems pased with whole numbers using the four operations, including problems in which remainders must be interpreted



Vocabulary Check-In

Review vocabulary as needed

Lessen 7 . Solving Multistap Story Problems with Addition and Subtraction



2 Solving Multistep Problems

ACCESS (10 min)





COMMON MISCONCEPTIONS AND ERRORS

- Students often look for keywords to indicate which
 operations are needed to solve story problems.
 However, keywords do not always work
- Students may not be able to formulate or implement a plan for so ving multistep problems.
- Students may not result there is often a "niccen"
 question they must arrower before they can up to
 multistep problems.

Hidden Question

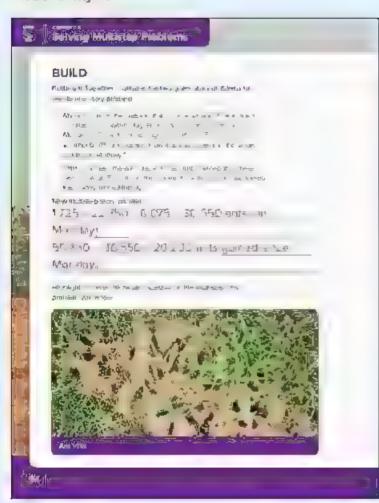
- T Direct students to Lesson 7 ACCESS Hidden Question. Ask a volunteer to read Problem 1 aloud
- 2 Have students work independently or with a partirer to so we the problem. To students to give a Trumbs up when they are done
- 3 After students are finished, ask them what operation they used to solve the problem. Go over the answer to Proplem 1 on the board and allow students to correct their work if needed
- 4 Direct students back to their Student Materials to read Problem 2 to their rollves. Ask students to discuss what information they need to so ve the problem. They need to the information from the answer to Fruit and 1.
- 5. Ask students to so we Problem 2 independently or with a partner. After students are finished, ask them what operation they used to so ve the problem. Go over the answer to Problem 2 on the board and allow students to correct their work if needed.
- 6. Explain that some story problems are two story problems put tegether. For example, we could put Problems 1 and 2 tegether to make a story problem Explain that these problems are called multister problems because we have to answer more than one question. Ask students to underline the two questions in Problems 1 and 2. How may 10 for a left in Colony A2 and Hawmany in the artists of example in the problems.

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- Ask students what would happen if we did not solve Problem 1. Would they be able to solve Problem 21 to A low students to share their thinking, and then explain that the question from Problem 1 is the "hidden" question—the objection we must answer before we can solve Problem 2.
- B Explain to students that there is often a "hidden" question in multistep story problems and that they must answer that question before the can solve the whole problem

Answer Key for Hidden Question:

- 1 1 25 to 24 and
- _ 555 -4 + ants

BUILD (40 min)





Putting it Together (15 mm)

- 5 Direct students to Lesson 7 Bull Direct students to Lesson 7 Bull Direct students a found ask your teers to read the story problems a found
- 2. Ask students to freip you compine the two given story problems and rewrite them as one multistep story problem. Write the new story problem on the board Ask students to record it in their Student Materia's
- Ask students to remaid the new propilem and write the hidden question. (How many ants and Misnam count?)
- A. Explain that sometimes the nidder question is not written in the proplem. However they stall must determine what information is needed to solve the problem and solve to find that information. On the board, cross out the question. "How many antisidid Maram count?"
- 5. Challenge students to solve the problem and compare their answers with their partner. Go ever the answers together and remind students that good mathematicians show their work and persevere to solve challenging problems. Reference the Thinking Like a Mathematician anchor than

Answer Key for Putting It Together:

- * * 7 * + 1. 780 + 6 075 30.550 ants (counted by Manach)
 - 5 + 5 + 1550 = 20,200 ants (left to be counted by Mariam)

Lesson 7 . Solving Multistap Story Problems with Addition and Subtraction



2 Solving Multistep Problems

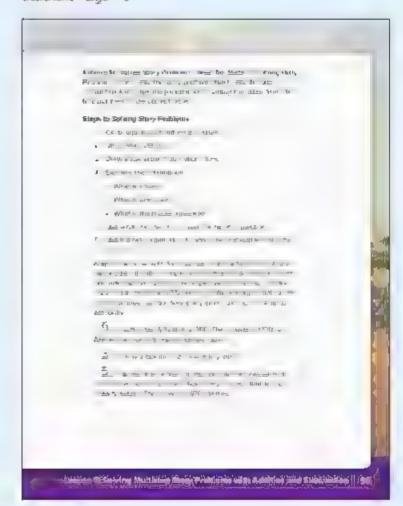
Solving Multistep Story Problems (25 Min)

- 1 Explaint o students that there are specific steps they can take to make sure they are answering all parts of a multistep problem. Direct students to Lesson 7 Build Solving Militiatep Story Problems
- 2 Ask volunteers to read the problem-solving steps aloud Stop to discuss each step, making sure students understand what each step means and how the step might fleightem solve stary problems
- 3 Exprain the direct ons for Problem 1 Stinlents should read the problem, and then number the steps a student took to so verifie problem so that they are in the night order. They should use the Steps to Solving Stony Problems to guide their thinking, (Consider having students work in pairs so they can support each other).
- 4. After a few minutes, ask students to share their thinking Confirm the correct order of the steps
- 5 Have students work independently or with a partner to solve Problems 2-4
- 6. At the end of Bu LD, go over the answers with students. If time allows, ask students to share the challangas they had was other students to help provide insight and support. If possible

Answer Key for Solving Multistep Story Problems:

1 saction the Colling of the arrest of the communication of the colling of the co

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Student Pages 96-97



- a mariner to the more calones should
- 2 1 375 + 51 37 80 . T
- 3. $59,000 + 2^{-5} + 52^{-5} + 119^{-5}$ $156,000 + 119,800 \neq 30,500$ sators
- 4 4.9 347 + 17 9 + 61 42 ; F1 Rate 347 - 50 , 18 - 6 - 61 - 194 / 18

CONCEPT Solving Multistep Problems

CONNECT (7 min)



Writing About Math

Asi students to turn to lesson 7 CONNECT Withing About Math and respond to the prompt.

WRAP-UP (3 min)



Let's Chat About Our Learning

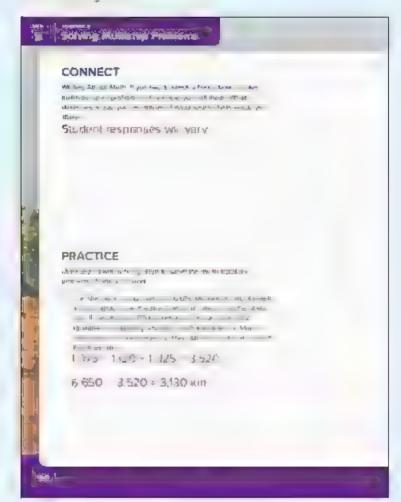
Ask your risers to share their Writing Apput Wath responses with the whole group. Command students Who volunteer

IEACHER NOTE Consider Later, this White distance Mailed to Be a fellowathe dependent that has abode? 1-1 m - * - at support and THE STATE

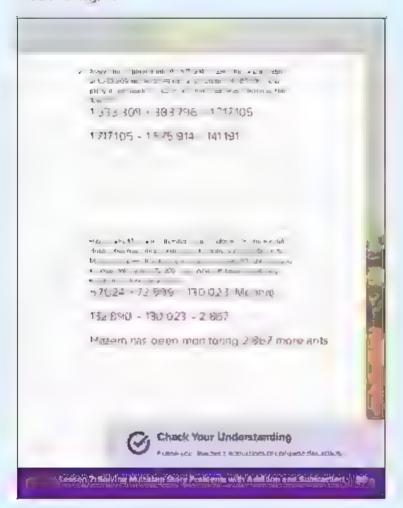
PRACTICE

Direct students to Lesson / FRAC PCE and have them completé thé problemis. Address student errors and misconceptions

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Check Your Understanding

wise the problem so and steps to solve the multi-step stury problems, show your work

1 The Silvez Canalle stands from Port Sald to the city of Sueziand is 193 120 meters long. It a post travels 38 620 meters each day for 5 days, now many more meters will theed to travel to reach the end of the canal?

2 Matrium has a population of 429,999 in North Sinal Has a population of 474,401 and South Sinal has a population of 108,981, how many more people live in North Sinal and South Sinal consumed than all Matroun?

3 Salma was counting ants thickney A. Shie counted 1,525 ants on Monday, 19,750 ants on Tuesday, and 3,705 ants on Wednesday. If there are 30,520 ants in colony A, how many more arts does she still need to count?

2 Solving Multistep Problems

Concept Check-In and Remediation

Lesson Overview

inithis lesson, students work to correct misconcept and affors from Concept 2.5c and Multistep Problems and affors from Concept 2.5c and Multistep Problems First, administer the Concept Check-Ini. Once you have reviewed the quiz results, thoose remediation activities based on the needs of your students. Some recommendations are listed below, but the needs of your particular students should inform your choices Students may work independently. In pairs, or in a small group with the teacher

Lesson Essential Questions

- What are the different ways to add and subtract?
- Which strategies are the most efficient?
- "how can estimation help the solve problems accurately?

Learning Objective

in this lesson

 Students will well-to contect misconceptions and term is related to so und multistep story problems.

Grade-Level Standards

- 4.A.2.a Fluently add and subtract multi-digit whole numbers
- 4.A.2. Hustrate and explain calculations using equations or models
- **4.C.1.d** Solve must, step word problems posed with whole trambers using the four operations, including problems in which remainders must be interpreted
- 4.C.1.d.1 Use etters in equations to rapresent unknown quantities



Vocabulary Check-in

Review concept vocabulary as needed



Materials List

Materials may vary



Preparation

Preparation may very

DIGITAL



Concept Check-In and Remediation



Carck Code edm#4060

- Students may strugg te to determine what a variable represents and how to find the
 value.
- Students often look for keywords to makeate which be perations are needed to solve story problems. However, veywords do not always work
- Students may not be able to finnounte at implement a pien far solving multistap problems
- Students may not realize there is often a "hidden" question they must answer before they can solve multislep problems.

Concept Check-In and Remediation

If...

Students struggle to determine what a variable represents and now to find the value

Then...

Review Build from Lesson 6. Consider having students look for places where a tetter is used to represent a word For example, 12 = Non an AC (12 numbers on an apalog clock), 4 = 5 n at Y (4 seasons in a year), 60 = M in an at 24 = H in a D, 12 = M in a Y, and so on Discuss now letters can represent numbers, top, too. Use marripulatives to help them solve small-number and trom and subtraction problems with unknowns

If...

Students do not understand what they are being asked, especially when the problem rules a hipden question

Then...

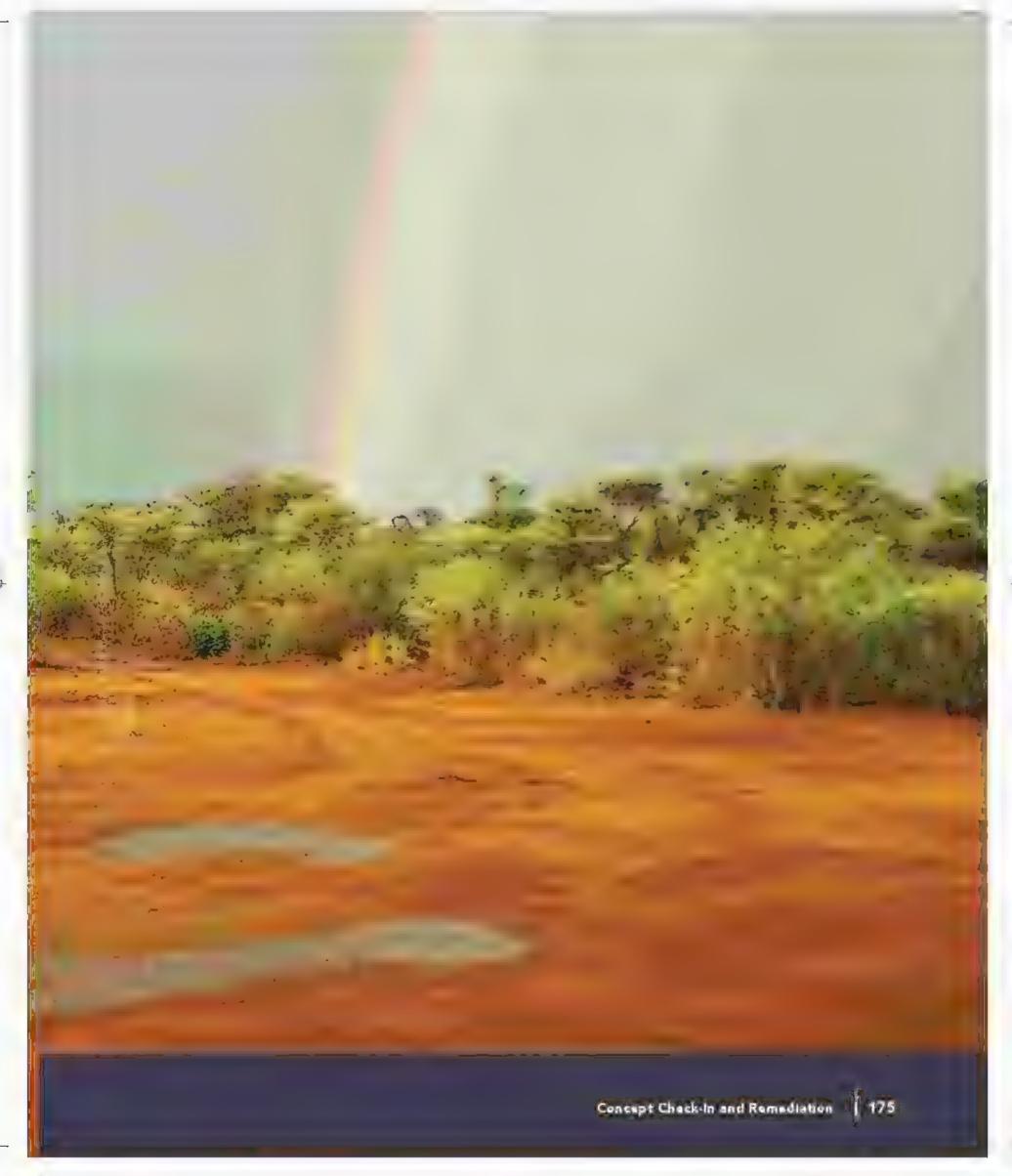
Review Putting it Together from
Lesson 7 Consider having students
craw or map out story propiems to
dentify what they know and what they
do not know Manipulatives can hep
make the concepts ess abstract

If....

Students cannot formulate or implement a plan for solving a multistep problem

Then...

Review Steps to Solving Story Problems from Lesson 7. Work through several story problems with students, guiding them through the problem-solving steps each time. Visual zation can be helpful to some students, as well Associated to see what is happening in the problem in their minds and determine what is imposing





Theme 1 | Number Sense and Operations

Unit 3 Concepts of Measurement

ESSENTIAL QUESTIONS

- I have are memeral or measurement related to each other?
- What are the relationships between units of time?
- How can represent and interpretidata with a scaled number line?
- What strategies are most effective and efficient for me when solving problems?







The Jnit 3 Opener Video, it's an Antis life lises measurement to describe the life and work of different types of antis. Omar and Mariam are fascinated by antis and are exploring different types of antin is. They want to use measurement to compare. Because antin is vary greatly in size, they may need help converting measure help converting measure help converting.



Сыян Саф (agrit4027

- How big was the biggest antion anti- you have ever seen?
- Why would Omar and 'Mar are need to change units of measure to compare anth is?



Key Vocabulary

As students invest, distanced to the following key vocabulary

analog, capacity, centi-centimeter, convertion, convert, decade, decompose, digital, elapsed, elapsed time, grams, kilograms, kilometer, langth, the plot, that mass, meter metric system, multi-, mill ter, millimeter, open number me, ratio table, scare, volume, weight



Ou dir Carte ∈gmt40£8

Unit 5 Concepts of Mescurement

Concepts of Measurement

Unit Storyline



Unit 3 Concepts of Measurement Storyline

The Concepts of Measurement unit extends students' working (nowledge of now to use a centimeter ruler, determine appropriate units of measurement, and when to use an exact measurement versus an estimation. Students apply these fearings to every problems to further their understanding and ability to move between many metric units of tength measurement and analyze data. To support learning, students observe video footage and investigate problems related to anticommunities to emance their understanding of measurement.

Unit Standards

4.D.1	Solve problems involving measurement and conversion of measurements
4.D.1,a	Demonstrate understanding of relative sizes of measurement units with none system of units noteding length (mill meters, centimeters, decimeters, meters, kilometers), mass (grams, kilograms, tons), capacity (mill liter and star), and time (second, minute, pour, day)
4.D.1.b	Less the four operations to some story problems in youring distances. Intervals of times input capacity, messes of objects, and money
4.D.1.c	Represent measurement quantities using diagrams such as humber line diagrams that feature a measurement scale

Unit 3 Structure and Pacing

This structure and pacing guide is based on a Mathematics program that is 60-minutes/5 days a week. See the Alternate Pacing Guides for recommendations for 45-minute and 90-minute essons.

If Mathematics instruction is based on 60 minutes/5 days a week, deliver the lessons as written in the Teacher Edition.

Concept 1: Metric Measurement

Essential Questions

- How are metric units of measurement related to each other?
- Which problem-solving strategies are most diffective and efficient for me?

Ant Travel

Learning Objectives

Lesson 1

Lesson 2

- Students will explain the relationship between metric units of length
- Students will convert between metric units of length.

Student Learning Targets

- train explain the relationship between metric units of length
- troat den vert between matric units ef enigth

The Weight Can Wait

Learning Objectives

- Students will explain the relationship between metric limits of mass.
- Students w. convect between metric units of mass

Student Learning Targets

- I tran explain the relationship between metric units of mass
- . Lan convert between metric units of mass

Unit 3 Concepts of Measurement

Concepts of Measurement

Unit Structure and Pacing cont'd

Fill It Up

Learning Objectives

Lesson 3

- · Students will explain the relationship between metric units of capacity
- Students w., convert between metric units of capacity

Student Learning Targets

- I can explain the relationship between metric units of capacity
- I can convert between metric units of capacity

Measurement and Unit Conversions

Lesson 4

Learning Objectives

- Students will compare place value relationships and measurement conversions.
- Students w., use multiplication and division to convert upits of measurement

Student Learning Targets

- I can compare piace value relationsh ps and measurement conversions
- I can use multiplication and division to convert units of measurement.

Concept Check-In and Remediation

Learning Objectives

 Students will work to correct muscanceptions and emors related to converting metric units of length, mass, and volume

Student Learning Targets

 I can correct my misconceptions and errors related to converting metric units of length, mass, and valuine

Concept 2: Time and Scaled Measurements

Essential Questions

- · What are the relationships among units of time?
- Which problemsolving strategies are most effective and efficient for me?
- How cap, represent and interpret data using a scaled number line?

What Time is it?

Learning Objectives

• Students will tell time to the minute

Lesson 5

. Students w., explain relationships between units of time

Student Learning Targets

- . I can tell time to the minute
- I can explain relationships between units of time.

How Long Does It Take?

Learning Objectives

- · Students will explain elapsed time
- Students with so we elapsed time problems
- Students will expeal the strategies they use to solve elapsed time problems.

Leason 6

Student Learning Targets

- can explain a apsed time
- car solve elabsed time problems
- tran explain the strategies, use to solve elapsed time problems

Unit 3 Concepts of Measurement

Concepts of Measurement

Unit Structure and Pacing cont'd

Scaled Measurements

Learning Objectives

- Students will oreste the plats to represent given data
- Students will select an appropriate key and scale for since pict.
- Students will write questions that can be answered by their ne pints.

Student Learning Targets

Lesson 7

- . I can create a ine-plot based on given data
- · can select an appropriate key and scale for my me prot.
- . can write questions that can be answered by my line plat

Concept Check-In and Remediation

Learning Objective

 Students will work to correct misconceptions and empts related to time and scaled number lines

Student Learning Target

 "canicorrect (by misconceptions and errors in medito time and scaled number mes

Concept 3: Measurement All Around

Essential Question

Lesson 8

Lesson 9

Which problemsolving strategies are most effective and efficient for me?

Measuring the World around Me Part 1

Learning Objectives

- . Students will add and subtract to solve problems
- Students will solve story problems involving measurement
- Students w., apply a variety of strategies to so ve story problems

Student Learning Targets

- I can add and subtract to so we measurement problems:
- I can solve story problems involving measurement.
- I can apply a variety of strategies to solve stary problems

Measuring the World around Me Part 2

Learning Objectives

- Students will mustip y and divide to some problems.
- Students with so ve story problems involving measurement.
- Students will apply a variety of strategies to solve story problems.

Student Learning Targets

- Lean multiply and divide to solve measurement problems.
- can so ve story problems myolyma measurement
- can apply a variety of strategies to solve story problems.

Concept Check-In and Remediation

Learning Objective

 Students will work to correct misconceptions and errors related to solving measurement story problems using the four operations

Student Learning Target

 I can correct my misconceptions and errors related to solving measurement story problems using the four operations

Unit 3 Concepts of Measurement

Concepts of Measurement

Alternate Pacing Guides

If Mathematics instruction is based on 45 minutes/5 days a week, do the following:

Reduce ACCESS by 3 minutes

Reduce Bu D by 8 minutes

Reduce CONNECT by 2 minutes

Reduce WRAP & P by 2 minutes

Strategies for reducing time in each section:

- . Discuss fewer examples
- · Eliminate Shou der Partner conversations
- Shorten class diseussions
- Work with students to complete ACCESS problems

If Mathematics instruction is based on a combination of 45 minutes/4 days a week and 90 minutes 1 day a week, do the following:

For low the 45-minute approach for the 45-minute days

Teach two 45m nute lessons on the 90-minute day

If Mathematics instruction is based on 90 minutes/5 days a week, do the following:

ncrease ACCESS by 5 minutes

increase BUILD by 20 minutes

neresse CONNECT by 3 minutes

ncrease WRAP UP by 2 minutes

Strategies for increasing time in each section:

- Discuss additiona, examples as needed
- Extend class discussions
- Allow time for hands-on work with man pulatives and modes
- Provide additional practice problems for students who need additional practice
- Encourage students to share and mode, their problem-solving strategies.

Metric Measurement, Time, Data, and Unit Conversions

In Primary 3 students measured using a certificater river determined appropriate units of measurement, and learned when an exact measurement could be used and when an extimate was appropriate. They also practiced converting between two metric units of length, mass, or capacity in Primary 4 students work with conversions and story properties to further their understanding and ability to move between many medic units of ength measurement. A focus for this conversion is to see the relationship between the Base Temp ace value system, and conversion in metric measurements. Students recognize patterns of converting units on the place value chart and change larger in to to smaller units, understanding conversions will each to solving story problems is not a four operations.

in Frimary 3, students learned to tell time to the minute and solved simple elapsed time problems, in Frimary 4, students focus on the relationship between units of time and convert between units to solve real world, elapsed time story problems.

in Primary 3, students used a line plot to represent and analyze a set of data in Primary 4, students examine measurement data and create the plots with a measurement scale to represent data and analyze the data Later in Primary 4, students create the plots with fractional units

Solving Multistep Story Problems

In Primary 3, students used blace value concepts to convert patween millimeters, send meters, and meters and between grams and imagrams. They solved one- and two-step stary problems are vary enough, mass, and time. In Primary 4, students use the four operations to solve multistep story problems involving distance, time, capacity, and mass. They investigate and apply a variety of problem-solving strategies, expanding their "toolsit" of strategies they can use to solve any type of story problem.

Unit 3 Concepts of Measurement



Medric Measuremt



-4

Concept Overview

In Concept 1: Metric Measurement, students review units of length mass and capacity and extend their understanding by investigating the relationships between units. Students make connections between the metric conversion chart and the place value chart inclining the understanding that, as we move to the left in a place value than the value of the digit increases by 10 times. Students also recognize that the same measurement can be represented in multiple ways (for example, 100 centimeters is the same as 1 Meter). Lessons 1, 2, and 3 are deliberately similar to help students see patterns in the metric system.

Concept Standards

- 4.D.1 Solve problems involving measurement and conversion of measurements
- **4.D.1.a** Demonstrate understanding of relative sizes of measurement units within one system of units including length (m. imeters, certimeters, decimeters, maters, knometers), mass (grams, kilograms, tens) capacity (m. iter and iter), and time (second, minute, hour, day)
- **4.D.1.b** use the four operations to solve story problems involving distances, intervals of time, inquire capacity, masses of objects, and money

Concept 1 Metric Measurament

Concept Planner

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives	
1 Anti Travel	Metric Conversion chart (Create a large Metric Conversion chart) Meter stick Centimeter nuer Excavated anth (Image (In Student Materials)	Cantineter Cantimeter Convert Decompose Ki, a= Ki ameter Length Meter Meter Meter Mill- Milmeter	Students will explain the relationship between metric units of length Students will convert petween metric units of length	
2 The Weight Can Wait	 An object that weighs about a gram (Paper clip or pen) An object that weighs about a kilogram (A Ter bottee of water, bag of rice, pricappie) 	Grams Kijograms Mass Weight	Students will explain the relationship between mear cunits of mass Students will convert between metric units of mass	
3 音. k sp	A container with a capacity of 1 inter, such as a water potition. A container with a capacity of 1 m lifter, such as a dropper. Diagram of 1-ther Gy inder with mill Measurements (in Student Materials). Large plank Measurement Terms anchor chart.	Capacity Liter Milliter Volume	Students will explain the relationship between metric units of capacity Students will convert between metric withts of capacity	

Common Misconceptions and Errors

- Students may struggle to remember conversions for method units of length
- Students may confuse the units of measurement with what is being measured (length, mass, volume)
- Students may compare or try to convert numbers without considering the units of measurement



Opportunities for Formative Assessment

Measurement Review, Decomposing and Renaming Unit Conversions.

The Ivest Practice, Check Your understanding

- Students may struggle to remember conversions for units of mass
- Students often confuse the units of measurement with what
 is being measured (langth, mass, volume)
- Students may compare numbers of measurement without considering the units

Error Analysis, Conversion and Application, Writing About Math, Practice, Check Your Understanding

- Students may struggle to remember conversions for metric units of capacity
- Students may struggle with story problems that require converting to the same units before solving
- Students often confuse the units of measurement with what
 is being measured (jength, mass, valure)
- Students may compare numbers of measurement without considering the limits

Number Task, Decomposing and Renaming, Multistap Conversions, Math Language Review, Practice Check Your Understanding

Concept 1 Metric Measurement

Lesson	Materials for Lesson	Vocabulary Terms	Learning Objectives
4 Maasurément and Unit Conversions	Metric Conversion chart (From Lesson 1)	Review vricabulary as riseried	 Students will compare place value relationships and measurement conversions Students will use multiplication and division to convert units of measurement
Concept Check in and Remediation	Materia.s may vary	Review concept vocabulary as needed.	Students will work to correct miscon captions and errors related to converting metric units of ength mass, and yourse

Opportunities for Assessment:

in addition to the assessment opportunities included in this chart, each concept will neitide a Concept Check-in

Common Misconceptions and Errors

 When converting units, students often divide instead of multiplying and vice versa



Opportunities for Formative Assessment

Error Analysis, More Conversions, Writing About Math. Practice, Check Your Understanding

- Students may struggle to remember metric conversions
- Students often conflice the in to of measurement with what
 is being measured (length, mass, volume)
- Students may compare numbers of measurement without considering the units
- When converting units, students often divide instead of multiplying and vice versa

Concept 1 Metric Measurement

CONCEPT Metric Measurement

LESSON 1 **Ant Travel**

Lesson Overview

in this essen, students decuss why measurement is importantiand what types of things we measure using units of length. They compare the relationships among mr meters, centimeters, meters, and cliometers and learn how to convert between thirts. Students complete conversion tables between units and answer story preblams connecting back to train knowledge of arts

Lesson Essential Questions

- How are metric units of measurement related to each other?
- Which problem-selving strategies are most effective. aris efficient for ma?

Learning Objectives

In this lesson

- Students win expain the rest onship between metric units of enough
- Students will convent between metric units of gratin

Grade-Level Standards

- 4.D.1.a Demonstrate understanding of feative sizes of measurement what with night system of units including length (m), mesers, contimégers dec metars, meters, kilometers), mass (grams, kilograms, tons), capacity (m .litter and litter), and time (second, minute, hour, day).
- 4.D.1.b Use the four operations to some word problems involving distances, intervals of time, liq.id capacity, masses of objects, and money



Vocabulary Check-In

centi- centimeter, convert, decampose, via-, k ometer length, meter metric system million m wheten



Materials List

- Metric Conversion chart
- Meter stick
- Ceptimeter ruler
- Optional Video: Glant Anthill Excavated
- Lesson / Excavated Antiny Image (See end of volume)



Preparation.

Me additional preparation meaded

DIGITAL



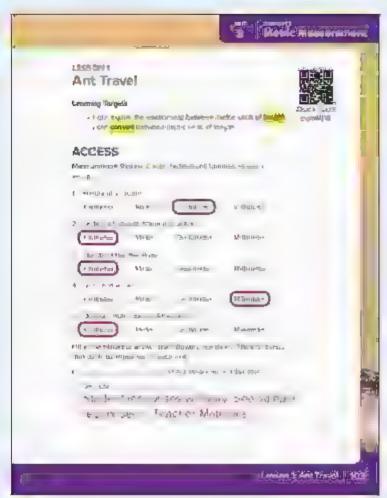
Lusson 1 Ant Travel



egimi4016



Student Page 103



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students thay struggle to reprember phoversions for metric units of length
- Students may confuse the units of measurement with what is being measured flength, mass, capacity)
- Students may compare or try to convert numbers without considering the units of measurement.

Measurement Review

- 1 Show students a meter stick and a centimeter rule. Point out the meter milimeter and centimeter measurements.
- Ask the class questions to promote a not discussion about measurement, such as
 - What is the smallest unit of measurement on this tool² (m. imetal
 - What's the largest unit of measurement on this too. Timeter,

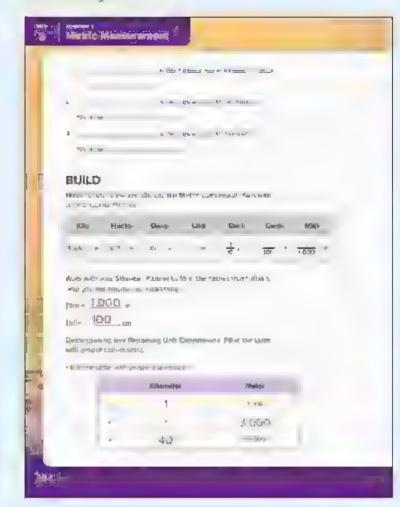
3 Metric Measurement

- What could we measure with these tools? (length
 4. Letter 1. Letter 2. Letter 2. Letter 3. Letter 3.
- Why do we not have a kilometer ruler" (it would be too ong)
- What do you notice about the words we use to describe units of length in the metric system?
- How would our measurement of the distance between home and school change if we used knowners, meters, centimeters, or millimeters?
 - What unit of measurement would make the most sense? Why do you think so?
- Could we measure the length of an anti-nikilometers? Why or why not?
- 2. Remforce that lengths can be measured using any unit, but smaller numbers are easier to work with, which is why we say samething is 5 minmeters instead of 5,000 meters, or 500,000 cent meters, or 5,000,000 mm implairs. All of these numbers represent the same length, but 5 is easier to work with than 500,000,000. Also reinforce that smaller lengths cannot be measured as effectively with large units.
- 4. Direct students to lesson 1 ACCESS Measurement Review and ask them to independently solve the problems
- 5. Use Caing Sticks to choose students to share their work

Answer Key for Measurement Review:

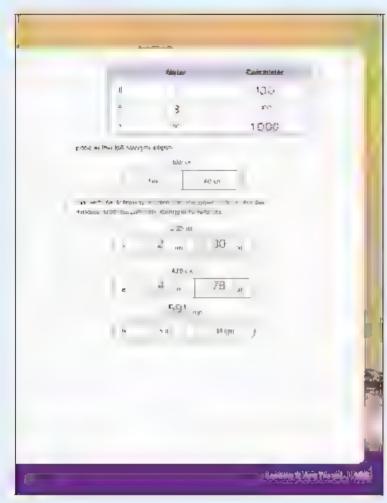
- 1 Height of a student. Meie anti-lete
- e etan tetr⊞en inme a deli ≥ Mader . Kamedel
- 3 Length of the L. & R. et h. Trester
- 4 Lemath it arrant Millinete
- 5 Distance from Carrotto Hexandira Williamster
- e of inswers will vary but stands it should identify appropriate matches, sively it exists of distances and the units of measurement.

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Student Page 195



BUILD (40 min)





Metric Units (10 mart)

For this activity, create a Metric Conversion chart for a splay, such as the one shown here

	Ko	Hecto-	Deca-	动物情	Degr	Centi-	Mir-
	1,000	1.00	1/0	Tank	1/10	1/100	1/1,000
1	JIT IL	units	却可能認		お口ば	unit	unit /

- 1 Ask students to read the Learning Targets in Lesson 1 Ant Trave, and self-assess their content understanding using Fish-to-Five
- Display the Metric Conversion chart. Ask Shoulder Partners to discuss what they not ce about the chart.
- After a minute, ask we unfeets to share what they noticed, if no students mention it, explain that the chart shows the relationships between metric units of measurement. For example, if the center whit is 1 meter, the other units end in meter, such as centuriteter and allometer. As we move to the left in the chart, the units of measurement get larger. As we move to the light in the chart, the units of measurement get larger.
- 4 Charally practice reading each place value name, what it is worth, and how the different measurements relate to each other. For example, decameter is the same as 10 meters, nectometer is the same as 100 meters, and so on A decameter is 10 times larger than a meter, but a decimeter is 10 times larger than a meter, but a decimeter is 10 times smaller.
- 5 Ask stadents to work with their Shoulder Partner to fill in the blanks to help them remember the relationship between it ipmeters and maters.
- Ask students to identify the Lints of ength with which they are most and least fam, lar
- / Pose the following question to the class



 How are the relationships between metric units similar to the relationships between places on the place value chart?

Lesson 1 - Ant Travel | 195

8. Call on students to share-their thinking. Record students' responses on the board Students may see that when convert in a restriction, in the same transfer of the first transfer and transfer of the first transfer of t

(EAC me il.OTE The Understanding a lin demne utilises in adaptorning beach Some stagent has britished a resemble on but other has that This discussion lass the foundation for it, dents to beach to see connections between unit as they won timenal of

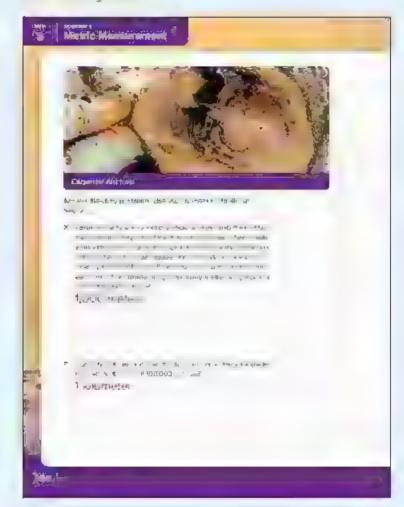
Decomposing and Renaming Unit Conversions (30 mm)

- Explaints students that converting metric measurements is another way to decompose and compose and compose and compose and the same, but it can be renamed with different units Explain that in today's esson, the focus will be to alloweters (km), metars (m), and centimeters (cm) since these are the most common units of length measurement.
- 2 Ask students to turn to Lesson 1 Bull Decemposing and Ranaming unit Conversions and work with their Shoulder Partner to complete Problems 1.-6
- 2. After a few minutes, review the answers as a class to ensure all students have the correct answers
- Direct students back to their Student Edition and ask them to leak at the Conversion Example



- 5 Explain that 140 certimeters can be converted or decomposed, to 1 meter and 40 cent meters. The sangth obes not change, but the units used to express that length are different.
- 6. Explain to students that the Conversion Example shows a par mode and not a scaled drawing, it is simply a representation of 140 cardimeters. Remind them we use par mode as a tool to help us solve mathematica, problems

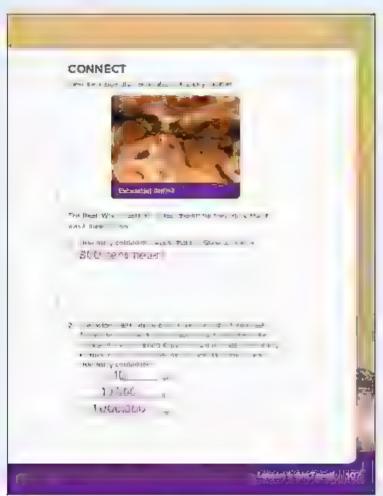
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Student Page 107



7 Ask students to continue to work with their partner to solve Problems 7–11 if students are struggling, regroup the whole class and work through the problems with them.

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TER PARTY TO A CONTROL OF THE CONTRO
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B During the last 5 minutes of Builli, go over the answers with students. Ask students to discuss any questions they have and strategies they used that he ped them solve the problems.

CONNECT (8 min)



The Nest

- 1 Ask students to turn to Lesson 1 CONNECT The Nest to view the image of the excavated anth if Explain that a group of myrmecologists were interested in finding out more about the structure of an arithin but were not sure how to study it without destroying the structure. They decided to pour concrete into the hole. They poured concrete for 3 days 10 tons of congrete After the concrete was set, they prought in meanan calldiggers to halp them remove the soi! They discovered a vast natwork of tunners that covered 50 square meters and went 8 meters down. To create the anthili, antimade bit ...ons of trips carrying 40 tons of soil out. of the ground. In human terms, each anticarried a zebra ablout 1 killemeter to remove sell from their ാർ ഒന്നു
- 2 Ask students to complete Problems 1 and 2

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- HER DOOFE The continue of a
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WRAP-UP (2 min)



Let's Chat About Our Learning

Explain that people intentire engine and distance artifle time, and it can be usefulto be able to qui brily convert Elatwean units Scientists use precise measurements When they collect and analyze data. Ask students to share examples of times when people in ght need to use precise measuraments. If plassible, find videos on the of arge anthill excavations to show students as additional support for the activities in CONNECT

PRACTICE

Direct students to Lesson 1 PRACT CE and have them complete the problems. Address student errors and m scarceptons

Check Your Understanding

Canyart to continue ters

- 1. 多面 ± 例20cm1
- $2 20 \text{ m}^{-1} \cdot 0 \cdot \text{cm} = 2.010 \text{ cm}$

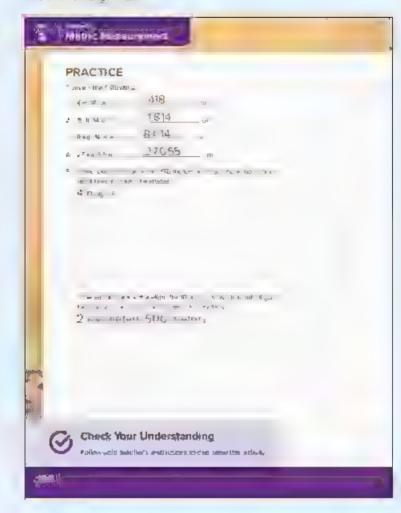
Convert to meters

- 3 23 km = 23,300 m
- 4 800 km 50 m = 800 050 m
- 8 5,950 m = 5 am 950 m

Lesson 1 Excavated Anthill Image



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Materials List

- An object that weight about a gram (paper ellip of pen)
- An object that weighs about a kilogram (a. liter bottle of water, bag office, pineapp el



Preparation

No additional preparation meeded

DIGITAL



The Weight Can Wait



€grint4017

LESSON 2 The Weight Can Wait

Lesson Overview

In this lesson, students review mass and convert between grams and a lograms, the most common units of mass, They begin with an error analysis of a mistakė sommon y made daring conversions of units of सामि Students work with conversion tap es and story problems to further their understanding of mass

Lesson Essential Questions

- How are metric units of measurement related to each other?
- Which problem-so ying strategies are most effective and efficient for me?

Learning Objectives

in this lesson

- Students will expiain the relationship between metric units of mass
- Students will convert between thetric units of mass

Grade-Level Standards

4.D.1.a Demonstrate understanding of relative sizes of measurement units within one system of units he ading angti (mil meters, centimeters, decimeters, meters, informeters), mass (grams, k lograms, tons), capacity (mil., ter and liter), and time (second, minute, hour, day)

4.D.1.b Use the four operations to solve word problems invalving distances, intervals of time, fig. di capacity, masses of objects, and money



Vocabulary Check-in

grams, kilograms, mass, weight

Lesson 2 . The Weight Can Wait

ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may strulge a to remember convarsions for Units of mass.
- Students often coritise the units of measurement with what is peling measured flength mass;
 volume).
- Students may contrare outry to convert numbers without considering the units of measurement

Error Analysis

- [Direct students to Lesson 2 ACCESS Error Analysis to complete the analysis
- After most students are finished, go over the answers as a class.

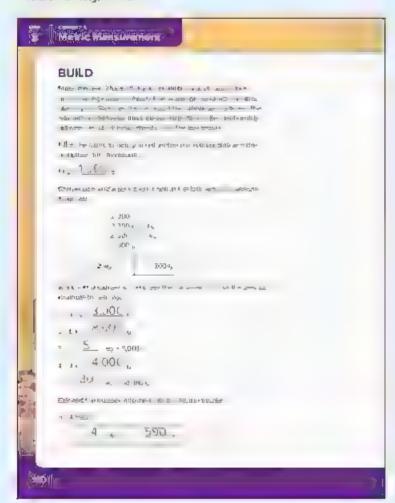
 The student or led y spot the und tomaids end retained to the architecture in the student highway to converted meters to contimeters by mathiplying . This steam is 10 The order to the student was the 145 . I

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Student Page 140



BUILD (40 min)





Mass Review (10 mm)

- 1. Explain to students that today they will look at a different form of measurement, mass. Remind students that they first teamed about mass in Primary 2 and studed it again in Primary 3. Ask students to share what they remember about mass. Share any of the following points that students do not share.
 - · Mass is usually measured in grams of kilograms
 - Grain and k ograin units are often referred to as "weights," but they are actually measures of mass, or how much matter is in an object
 - An object's MASS is consistent and unchanging the matter where the object is—on Earth, on a mountain, at the bottom of the ocean, or on the moon
 - However, an object's WE GHT can change For example, an object has a different weight on the moon than it does on Earth alse to the effects of gravity
 - Since students are measuring a libitects
 here on Earth. It is okay fithey use the word
 weight from time to time to trelp them build
 understanding of mass. However, remind them
 that mass and weight are not the same.
- 2. Show students the examples of objects that weightebout 1 gram and 1 k logian. Explain that it takes 1,000 grams to create 1 x logians
- 3. Ask the students to Popcom deas of objects that would be weighed in grams (a pencil, spices, arts) and knograms (people, sacks of vegetables or fit t, a charil.

Lasson 2 - The Weight Can Weit

3 Metric Measurement

- 4. Ask students to talk to their Shoulder Partner about the similarities between the relationship between mass measurements and the relationship between ength measurements from the last lesson Students should note that the relationship between sign at pecalise 1 in object of 1 in the last and 1 in agreems sign to 1,000 grams 11 in the relationship had be additional sign appears.
- 5. Ask students to turn to their Student Edition and fill in the blank to express the relationship between allograms and grams

Conversion and Application (30 mm)

Ask students to thin to Lesson 2 BU LD Conversion and Application and look at the Conversion Example

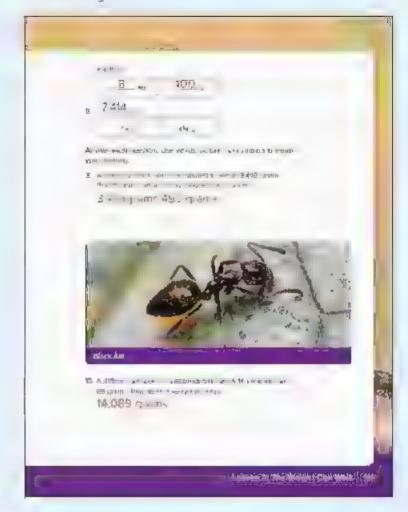
	2,300) g	
2	Ng	300	a)

- 2 Remind students this is a par model and is a too to help us as mathematicians. Discuss now 2,300 grants can be converted to 2 kilograms 300 grants. The mass is the same, but the units to express the mass are different.
- 3 Remind students triat the prefix 'x c=" means 1 000 and there are 1,000 grams in 1 knogram
- A six students to work with a partner to solve

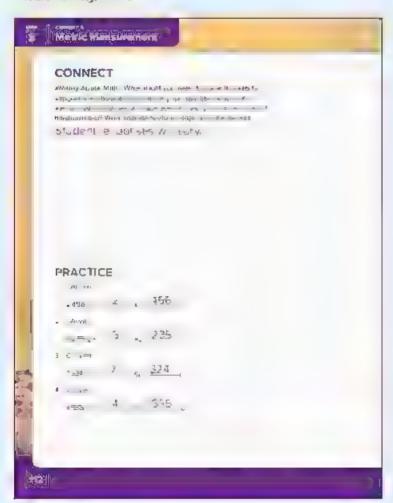
 Problems 1-10 if students are strugging, regroup
 the class and work through the problems together
- 5. During the last 5 minutes of BUILD, go over answers with the students. Ask students to discuss any questions they at indiversing strategies they used that he ped them so we the problems.

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Student Page 1/11



Student Rage 142



CONNECT (7 min)



Writing About Math

Ask students to tumbo Lesson 2 CONNECT Wrand About Math. Ask a valunteer to read the prompt aloud Then, neve students work independently to respond to the prompt

WRAP-UP (3 min)



Let's Chat About Our Learning

Ask students to share their writing with a partner. Then, ask your teers to share their thinking with the class. Encourage students to ask questions of each other

PRACTICE



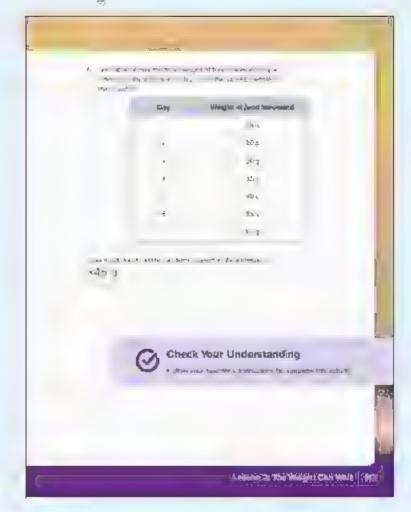
Direct students to lesson 2 PRACTICE and have there complete the propiers. Address student errors and miscenceptions

Check Your Understanding

Convert

- 1 3,80é g = 3 kg 80t 1
- z skyścy k kr.
- 3 3425g = 3 , 4 15 ,
- 4. 1 kg 10-g = 1.010-g
- E 16.452 g = 10 kg + 1 1

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Materials List

- A container with a capacity of fuller, such as a water bottle
- A container with a capacity of impulition, such as a dropper
- Lesson 3 Diagram of 1 Iter Cylinder With mile iter Messurements and Answer Key (See epd of this you wee)
- Large blank Measurement Terms and on chart

Measurement Terms					
ængth	Mass	Tapacity/No urne	Time		



Preparation

Create Measurement/Terms anchor chart

DIGITAL



Fill It Up



Cu al Code egant4018

LESSON 3 Fill It Up

Lesson Overview

In this esson, students investigate metric units of capacity. They examine a scaladicy most to determine that 1,000 in it items a equivalent to it item. They then convert different measurements and create tables to liability patients when convert his between in it ters and liters. Students when convert his between in it ters and liters. Students only in a recipe with a combination of weight and capacity measurement to and decipher between the two units. When so ving story problems in this resson, students must first convert to common units before solving. Finally, students check their understanding of measurement terms for each type of measurement covered in Lessons 1-3.

Lesson Essential Questions

- How are meand with of theatentement feated to each other?
- Which problem-solving strategies are most effective and efficient for me?

Learning Objectives

In this lesson

- Still dents will explain the relationarily between metric units of capacity
- Students will convert between metric units of capacity

Grade-Level Standards

- 4.D.1.a Demenstrate understanding of relative sizes of measurement units within one system of units including length (m. impeters, contimeters, declimeters, meters, mometers), mass (grants, k, lograms, tons), capacity (minuter and liter), and time (second, minute, holit, day)
- 4.D.1.b Use the four operations to solve word problems involving distances, intervals of time, quid capacity, masses of objects, and money



Vocabulary Check-In

capacity ater, millifitian volume

Lasson 3 - Fill It Up

ACCESS (10 min)





COMMONIME NUBBINGS TO

- Students may struggle to remember conversions for metric units of capacity.
- Students fray struggle with story problems that require convexting to the same units before solving
- Students often confuse the units of measurement with what is being measured (length, mass, volume)
- Students may compare or the to convent numbers without considering the units of measurement

Number Talk

- Explain to students that teday they will use benchmark numbers to help them solve multiplication problems
- 2 Inambel Talk of rectaons
 - Write a problem on the board
 - Students think questly and give a Thumbs-up when they know the answer
 - Give Wait Time so that a students have endudin time with nk about the problem
 - Call on several students who have the r
 Thumbs-up and record their answers on the
 board
 - Ask students to raise their hands to vounteer to explain their thinking
 - Record students' thinking on the board so other students can see their strategies
- Work through as many of the following problems as you can, in sequence
 - 2 × 20, 4 × 20, 6 × 20
 - . 7 x 5, 7 x 10 7 x 9
 - 2 x 40, 4 x 20, 2 x 50, 4 x 50
 - 2 x 50, 4 x 50, 8 x 50
 - 5 x 5, 5 x 10, 5 x 20, 5 x 19

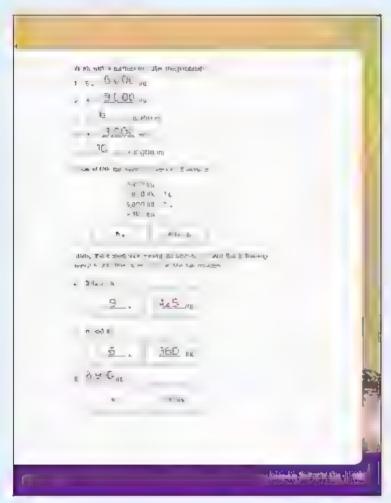
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Student Page 115



remember at but multiplication Strat

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BUILD (40 min)



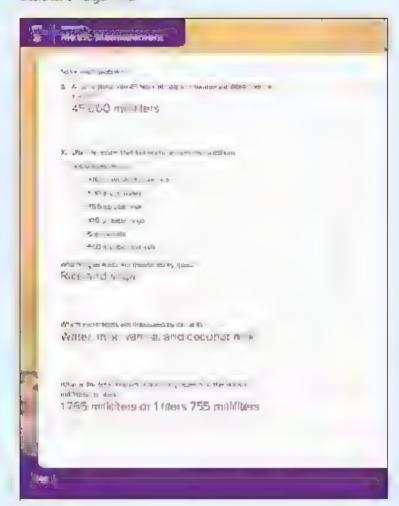
Decomposing and Renaming (25 min)

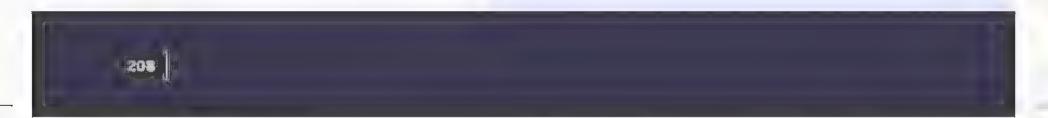
- I le students that ampther form of measurement is capacity, or how much injude conething holds. Explain that people oftenings the terms as a synonym for capacity, though the terms are a bit different. Volume refers to the space a 2-d mensional object occupies or contains, while capacity is a property of a given container and describes how much it can hold.
- 2 Show students a liter central net and militer container. Remind students that "mili" means one thousandth. There are 1,000 militers in 1 iter, just we there are 1,000 milimeters in 1 meter.
- 3. Direct students to Lesson 3 BUI, D Decomposing and Renaming. As a class, fill if the scale of the cylinder. Mode on the classroom chart how to measure from the base of the cylinder to the first neighbor students to count the number of lines on the cylinder and ask them what the labels should be

3 | Metric Measurement

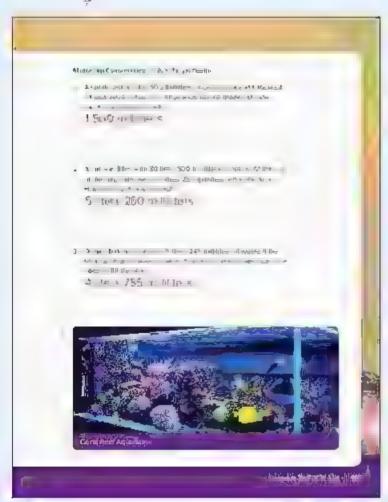
- 4 Ask students to work with a partner to solve
 Problems 1–5. After a few minutes, go over
 the answers together. Ask students now the
 conversion from mill mers to liters is similar to other
 measurement conversions they have earned
- 5 Ask students to complete Problems 6-10 with their partner "faudents are struggling, regroup the whole class and solve the problems together
- o After a few munutes, go over the answers together Encourage students to ask questions to help them clear up misconcept ons and correct errors

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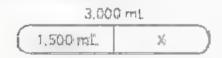


Student Page 147



Multistep Conversions (15 m.n)

- 1 Ask students to turn to Lesson 3 B Jr.D Multistep Conversions and read Problem 1 scent y
- 2. Ask students to talk to their Shoulder Partner about now they might solve the problem. After a minute, ca. on students to share their thinking with the class. Discuss students' strategies and ask questions to help quide their thinking.
- 3 Reinforce that students must convert a relevant measurements to the same unit in this case, they must convert 1 liter 500 ml. Iters to 1,500 m., iters and 3 liters to 3,000 before they try to subtract
- 4. If hetessary, mode how to use a bar model to he p solve the problem
 - 1 ½ 500 mp = 1,500 mp



- 3,000 mL 1,500 m. 1,500 mL
- 5 Consider students' current progress and decide how students will work to solve Problems 2 and 3. They can work with you as a whole group, work with a partner or you can split the classroom and have some students work independently or with a partner while the remaining students work with you
- Use the, ast 3 minutes of Bull_D to go over the answers as a class and to clear up any misconceptions

CONNECT (7 min)



Math Language Review

- In Direct students to Lesson 3 CONNECT Math Language Review.
- 2 Ask students to work with the r Shoulder Partner to fill in the Measurement Terms chart.
- 3 Ask students to help you complete your arge oppy of the Measurement Terms and for chart and display in the classifician.

WRAP-UP (3 min)

Let's Chat About Our Learning

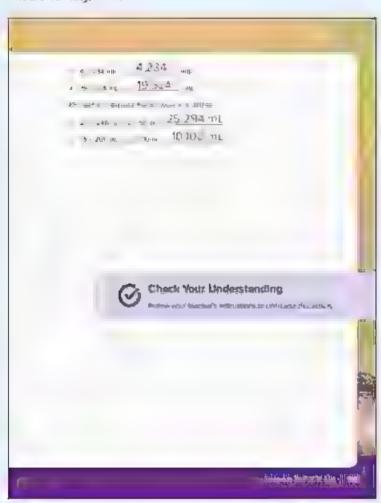
- F. Ask students to explain to their Shoulder Partner why the size, length, mass, and volume of an object remain the same when converted to another unit of measurement.
- 2 After a minute, ask students to share their deas with the whole group

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Student Page 149



PRACTICE

Direct students to Lesson 3 PRACTICE and have them complete the problems. Address studentierrors and miscenceptions

Check Your Understanding

Express the answers in multiplers

- 1 21 L + 2 L 800 m 2 -00 mL
- 2. #1 485 m. 323 ml = 4 162 m.

Сопуей

- 3. 11 1 342 mt 11 342 mt
- 4. 16,783 min 10 , 16" ml

LESSON 4 Measurement and Unit Conversions

Lesson Overview

In this essen, students synthesize their uncerstanding applications to the applications to the place value system. Students use the Metric Conversion chart, introduced at the start of this unit, to convert patween metric units and to solve real-world properns.

Lesson Essential Questions

- How are metric units of measurement related to each either?
- Which propiety solving strategies are most effective and efficient for me?

Learning Objectives

In this lesson

- Students will compare place value relationships and measurement conversions
- Students will use multiplication and division to convert units of measurement.

Grade-Level Standards

4.D.1.a Demonstrate inderstanding of relative sizes of measurement units within one system of units including length in meters contimeters, decimeters, meters, rometers), mass (grants, it ograms, tens) capacity (more tensical tensical tensical day).

4.D.1.b Use the four operations to solve word problems through distances, intervals of time, inquid capacity, masses of objects, and money



Vocabulary Check-in

Review vocabulary as meeded.



Materials List

Metric Conversion chart (From essen 1)



Preparation

No additional pleparation insected

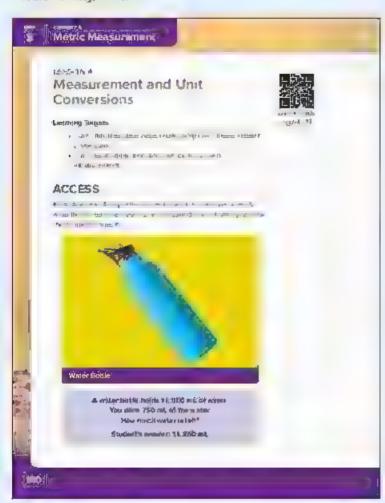
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Student Page 120



ACCESS (10 min)





COMMON MISCONCEPTIONS AND ERRORS

 When converting units, students often divide instead of imputioning and vice versa.

Error Analysis

- Direct students to Lesson 4 ACCESS Bror Analysis and ask them to complete the error analysis.
- 2 Review the answers as a class. The student did to now till tens. The it now tens. The it sent to multiple to more the subtracting some tens from 150 multiples. The items from 150 multiples.

Lasson 4 - Measurement and Unit Conversions

Metric Measurement

BUILD (40 min)



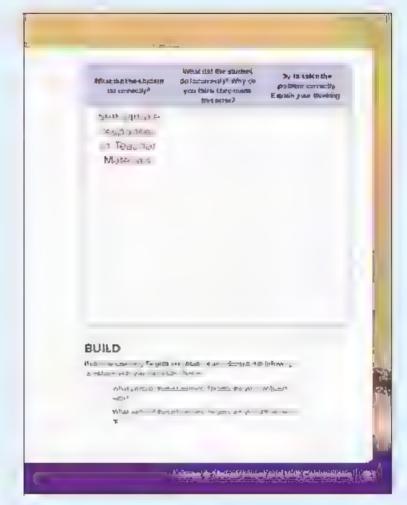
Chart Connections (15 m.m)

- 1. Direct students to the Lession 4 Learning Targets in their Student Edition. Ask students to read the Learning Targets and discuss the following questions with their Shoulder Partner.
 - What parts of these Learning Targets are you confident with?
 - What parts of these Learning larges are you still working on?
- 2 Direct students' attention to BL.ID Chart
 Connect ons in their Student Edition. Review
 the Metric Conversion chart with students. Asquestions to promote students' thinking, such as
 - What do you notice about this chart?
 - How is its involation a Place Value chart?
 - How is it different from a Place Value chart?
- S. use Calling Sticks to choose a few students to share what they notice

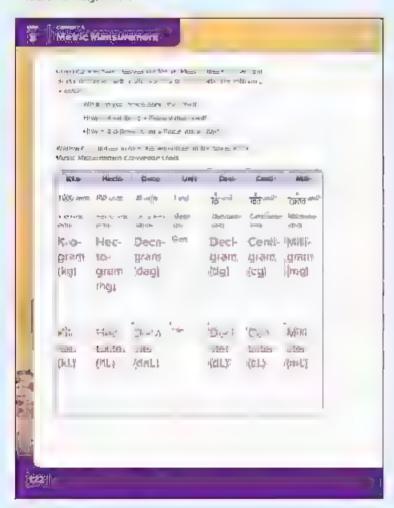
्रियांचा किया क्षेत्र क्षेत्

- 4 Expanthefollowing
 - On a place value that't, we multiply by 10 when
 we move to the lift and the numbers become
 arger (For example, when we move a 2 from
 the Ones to the Tens it becomes 20, and when
 we move it to the Hundreds it becomes 200)
 - In the metric system what we move to the left the digits become one er 2,000 meters becomes 200 decameters, 20 hoctometers, and 2 wildreters
 - That is because in a piace value chart the value of the digit is changing which means the value changes. However, in the metric system the value stays the same. An of the measurements are equivalent.
- 5 Ask students to work with a partner to fill in the remainder of the poixes in the Metric Conversion thant and to complete Problems 1 and 2. The meter row has been completed as an example. After a few minutes, go over the answers together

PRINT



Student Page 122



After students are fin thed, use Ca, ng Sticks to ask students to share what they notice

More Conversions (25 mm)

- 1. Ask students what operation they used to convert from larger units, like allograms, to smaller units, like grams (Multiplication)
- 2. Reinforce this by writing the following on the board

- 3. Share with the students that we mult ply 5 by 1,000 because we show that there are 1,000 grams in 1 kilogram, blease that it is like the place-value chart. As we move to the right 3 spaces, we are moving from a larger unit to a smaller unit, so we multiply by 1,000
- 4. Ask students what operation they used to convert from smaller in ts. I a certimeters to arger units. who metans. (Division)
- 5. Reinforce this by writing the to lowing on the board

- 6. Share with the students that we divide 500 by 100 since we know that there are 100 centimeters in 1 meter Netice that it is like the place value chart. As we move to the eff 2 spaces, we are moving from a sina at unit to a larger unit, so we divide by 100
- Ask students to turn to Lesson 4 BUILD More Conversions and complete Problems 1–7. This can be done independently, with a small group, or as a class, depending on the needs of the students

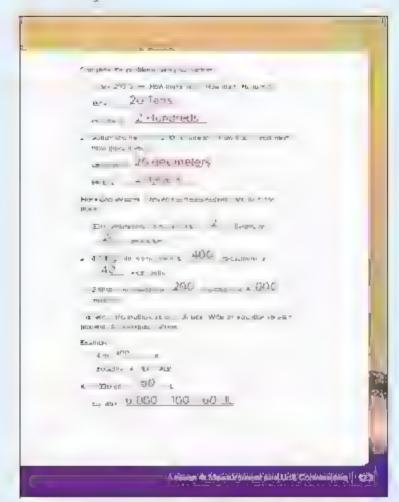
3 Metric Measurement

6. In the last 5 minutes of Bu LD, review all answers and resolve any lingering misconceptions and errors

Answer Key for More Conversions:

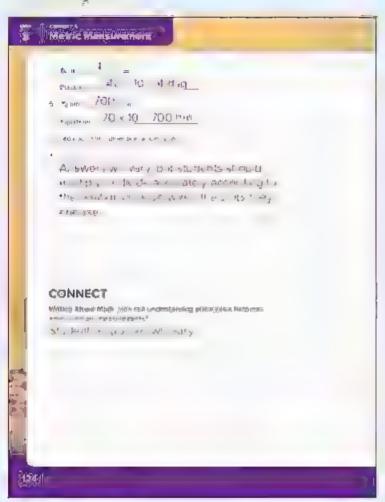
- 1 200 celtimeters 医enument to 1 meters a 1.2" in eter
- 2 4 ° 7 நாகுன் இறை, கொதுதார் 12 மில் அத்தது காசகா படிரி இதர் இது ≽
- B Zolen . Alpha en 200 et le a . 100 emillipe
- 4 6:000 ml 60 d_ 6 030 ÷ 100 : 60 d_
- 5 40 g = 4 dbg 40 -- 10 4 dag
- 6 70 mm = 700 mm 70 × 10 = 700 tm

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Student Page 124



CONNECT (7 min)



Writing About Math (7 min)

Direct students to Lesson 4 CCN NECT Writing About Math and ask them to respond to the prompt.

TEACHEM WOLL I A HER MAND THE WITTED TO THE MANDE TO THE MANDE CONTROL OF CON

WRAP-UP (3 min)



Ask students to share their deas with a partner Allow students the opportunity to revise or add to the round writing About Math response if needed

Lesson 4 - Measurement and Unit Conversions



PRACTICE

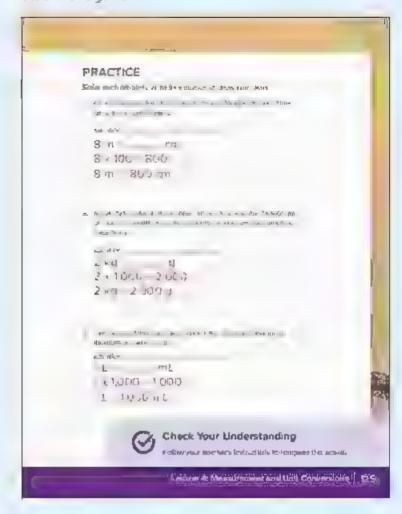
Direct students to Lesson 4 PRACTICE and have them complete the problems. Address student errors and Intisconceptions

Check Your Understanding

High light or splice in the equivalent measurements
 Create at least four more equivalent measurements

8.390	600 cm	40 cm	60,000 mm
8 kg	900 g	80 ng	60.000 dg
3.L	30 64	30 cL	3 000 mi
(Creatle your own)	Pespersies Tayvary	Hay wit,	Pesta sus may vary

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Materials List

Materials max vally



Preparation

Ne additional preparation needed

DIGITAL



Concept Check-In and Remediation



Culick Code egnit4020

Concept Check-In and Remediation

Lesson Overview

In this essent, students work to correct misconceptions and errors from Concept. It Understand Concepts of Measurement. First, administer the Concept Check the Once you have rewewent the guiz results, choose remed abon activities based on the needs of your students. Some recommendations are instead below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or in asmal, group with the teacher

Lesson Essential Questions

- How are metric units of measurement related to each other?
- Which problem-solving strategues are most effective and efficient for me?

Learning Objective

In this lesson

 Students will work to conscirm sconceptions and errors related to converting measurement units for length, mass, and volume

Grade-Level Standards

4.D.1.a Demanstrate understanding of relative sizes of measurement units with none-system of units including ength (m. ameters, centimeters, decimeters, meters, i., ometers), mass (grants, k, lograms, tens), capacity (m., iter and liter), and time (second, in nute, nour, day)

4.D.1.b Use the four operations to solve story problems involving distances, intervals of time, quid capacity, masses of objects, and money

Concept Check-In and Remediation



Review concept vocabulary as needed.

COMMONMACH CHIEF A. THE T.

- Students may struggle to remember the conversions for metric white of measurement
- Students often confuse the units of measurement with what is being measured flength, mass, yollung).
- Students may gorgrape on try to convert numbers without considering the units of measurement
- When converting units, students often divide Instead of multiplying and vice yersa.

220

15...

Then...

Students struggie to remember and solve the conversions for metric remain measurement.

Review Decomposing and Renaming Unit Conversions from Lesson 1. Review the terms with students and continue to werk on but mode sland conversion tables. Students can also profice measuring items with meter sticks and rulers and visually seeing the difference in the units.

lf...

Then.

Students struggle to remember and solve the conversions for metric weight measurement

Review Conversion and Application from Lesson

2. Review the terms with students and continue to work on bar models and convers on tables. Consider using Base Ten blocks to represent the units of measurement so that students can more readily see the relationships between some of the units.

If...

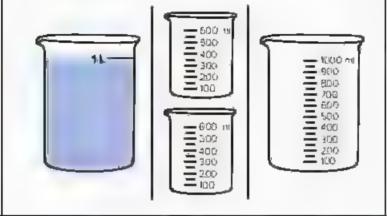
Then...

Students struggle to remember and solve the conversions for metric capacity measurement Review Decomposing and Renaming from Lesson 3 Review the terms with students and continue to work on berimposes and conversion tables

Concept Chack-in and Remediation



- is: Ask students why we divide
- 7 . sing the experiment in class color the containers in the middle to the line showing the amount of mill liters. In the last coloring to show where the water filled to when pouring it back.



Him

Students divide Instead of multiplying and uce versa to solve conversion problems

Then...

Review Chart Connections from Lesson 4 and choose measurements for students to practice writing in multiple form

The state of the second second

Concept Check-in and Remediation



Time and Scaled Measurements

224

Concept Overview In Concept 2: Time and Scaled Measurements, students tell time to the minute, so ve problems with elapsed time, and represent measurement data with a scale. These sk is and concepts are a challenging extension and application of what students previously learned in Frimary 2 and 3 Concept Standards 4.D.1,a Demonstrate understanding of relative sizes of measuremant units within one system of units including length (mill meters, cent meters, decimeters, meters, k orneters) mass (grams, kilograms, fons), capacity (muliter and itel), and time (second, minute, hour, day) 4.D.1.b use the four operations to solve story problems involving distances, intervals of time, aguid capacity, masses of objects, and money 4.D.1.c Represent measurement quantities using diagrams such as number line clagrams that feature a measurement scale

Concept 2 Time and Scaled Measurements

Concept Planner

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
5 What Time s #1	 Red and blue crayons or colored pencils (1 each per student) Analog clock with nour, minute. and second hands Ratiotals.es Wessurement analog chalt 	Analog Decade Digita Digita Blapsed Railo Tapa	Students will te time to the moute Students will explain relationships between units of time time
Does it Take?	 Frebiers Sowing Strategy anchor chart Create and display a Steps to Solving Story Problems anchor chart. Steps to Solving Story Problems Circle important numbers and abels 2 underline questions 3. Draw a box around operation class. 4. Event no the information What is known? What is the hidden question? 5. Lise what is known to answer the hidden question? 5. Lise the new information to solve the problem and find the unmown 	Conversion Elapsed time Open number ne	Students will explain elepsed time Students will explain the strateges they use to solve elepsed time problems.

-

227

Concept 2 Time and Scaled Measurements

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
7 Scaled Measurements	* Lesson 7 Image: Largest Foss ized. Ant (Located at end of volume)	Line poloni Scale	 Students will create line plots to represent given data. Students will select an appropriate key and scale for a line plot. Students will write questions that can be answered by their line plots.
Consept Check-in and Remad at on	Materials may vary	Review concept vocabiliary as needed	Students will work to conscion misconceptions and errors related to time and scaled number lines.

Opportunities for Assessment:

maddition to the assessment opportunities included in this chart, each concept will include a Concept Creck-in

- Students may not understand how to represent date on a line plot
- Students may not be sure what each Y represents on a life plat
- Students may incorrectly abeliane scale of a line plot or choose a key or scale that is not appropriate for the data

• Students may struggle to read time on an analog clock.
They may confuse the nour and the minute hands or think that the digits on the clock are in 5-minute intervals.

- Students may simulate to remember the conversions for time flowmany seconds in a minute, in nutes in an help, hours in a day days in a week
- Students may not have effective stategies to convert time intervals and solve a apsed time problems
- Students may not understand how to represent date on a line plot
- Students may incorrectly labe, the scale of a line plot or throose a key or scale that is not appropriate for the data.

₫,

Opportunities for Formative Assessment

Fun With Facts, wangth of Anta, Scales Everywhere We Look, Practice Check Your Understanding

Concept 2 Time and Scaled Measurements

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LESSON 5 What Time Is It?

Lesson Overview

In this essen, students review telling time on an analog creck. Then, they look at the units involved in telling time and use ratio tables to compare seconds to minutes, immutes to notice higher to days, and days to weaks. Students use these ratio tables to help them complete conversion problems and apply them knowledge to solve time conversion story problems.

Essential Questions

- What are the relationships among units of time?
- Which problem-solving strategies are most effective and efficient (crime?

Learning Objectives

In this lesson

- Students will tell time to the minute.
- Students will explain relationships between units of time

Grade-Level Standard

4.D.1.a Demonstrate understanding of relative sizes of measurement units within one system of units including length (mill imeters, centimeters, decimeters, meters, remeters), mass (grams, is logistms, tons), capacity (mill liter and liter), and time (second, minute, hold, day)



Vocabulary Check-in

arrating, decade, digital, etapsed, ratio table



Materials List

- Red and blue drayoms or colored periods
 (I exercise saldent)
- Amang door with hour minute, and second hands
- Ratio tables
- Weasurement anchor chart.



Preparation

We additional preparation meaded

DIGITAL



Lesson 5

What Time Is It?

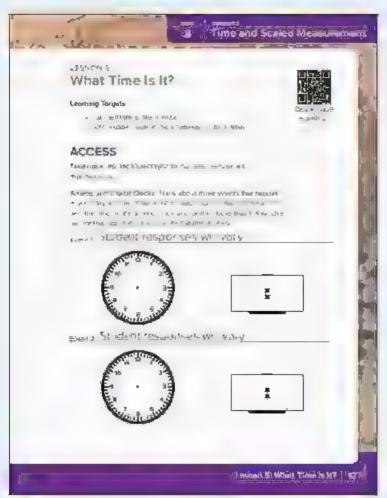


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230



Student Page 127



ACCESS (10 min)



COMMON MISCONCEPTIONS AND

- Students thay struggle to read time on an analog
 cook. They may confuse the hour and the minute
 thands or think that the digits on the clock are in.
 5 minute intervals.
- Students may struggre to remember the
 conversions for time, such as how many seconds
 in a moute, moutes man noon, hours in a day,
 days in a week, and so on.

Analog and Digital Clocks

- Distribute (or have students take out) a red and bile crayon or colored pensis to indicate the hour and minute hands
- 2. Direct students to work on Lesson 5 ACCESS
 Analog and Eigita Clocks. Ask students to record three events and the times they occur.
- Use Calling Staxs to saled #-5 students to share their events and record on the board the time in digital and analog formats
- Fase the following questions to the group and discuss
 - Why do we need to tell time?
 - Why is time considered a measurement?

3 Time and Scaled Measurements

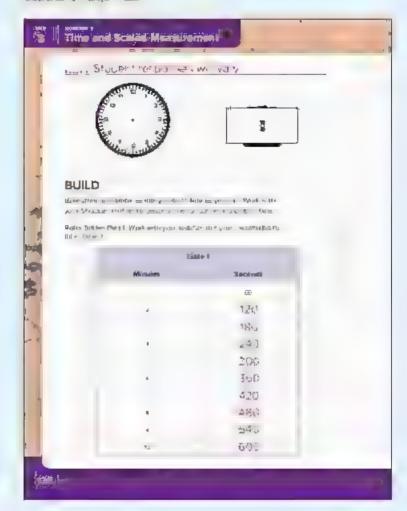
BUILD (40 min)

Ratio Tables Part 1 (20 mm)

- i. Ask students to charally lead today's Learning forgets. Remind students that they worked on telling time quite a bit in Frimery 3 but this year the focus along the relationship between units of time
- 2 Hold up an analog black and point to the three hands. Ask students
 - What units do these three hands represent? (Hours, minutes, and seconds)
 - Höw many seconds are in a minute? (**)
 - How many minutes are in an hour? (6").
- 3. Ask students to brainstorm and name as many units of time as they can. Record their answers on the beard and acid missing units if needed (seconds, minutes, hours, days, weeks, years, and decades).
- 4. Direct soudents to work with their Shoulder Partner to create a rule for converting minutes to seconds.

 Asi students to share their ideas
- 5. Ask students to discuss. Are their rules the same rules they use to convert metric measurements? Why ar why not?

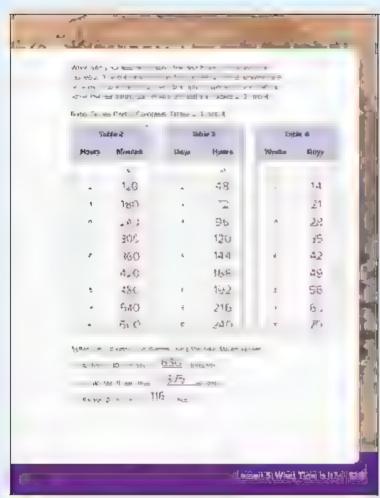
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Student Page 129



- 6 Ask students to open their Student Edition to LESSON 5 Build Ratio Tables Part 1
- 7 Expendible a ratio table shows the comparison of two or more numbers in relation to each other. This ratio table shows the relationship between minutes and seconds.
- 8 Draw a copy of Table 1 on the board. Ask students to help you fill out the Table 1 as they fill out the table in in their Student Editions.

Minutes	Seconds
1	60
2	120
3	750
4	4+1_
5	1
é	90 (4
7	414
20	48
Ģ	Ę
10	- 00

 Ask students to firm and Talk about how they could use the table to some how many seconds are in 15 mnutes?

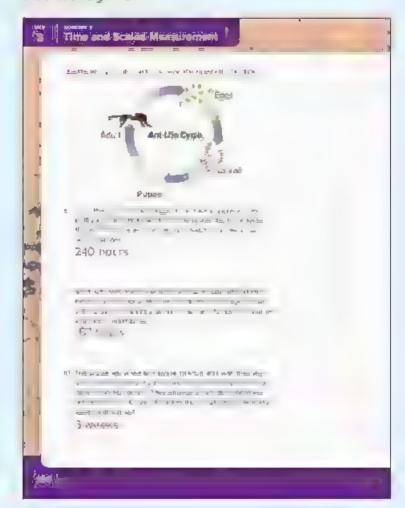
3 Time and Scaled Measurements

- 10 Use Calling Sticks to call on 2–3 students to share themideas, then ask:
 - Could a similar ratio table be made to convert hours to minutes? Days to hours?

Ratio Tables Part 2 (20 mm)

- 1.1 Work with students to salve the first three conversions for Tables 2, 3, and 4 in Ratio Tables Part 2. Discuss rules for converting. For example, to convert hours to minutes, multiply the number of nours by 60 minutes.
- 12 Tell students to Hands up, Pair Up to find a partner to work with to solve the remaining conversion problems in Tables 2, 3, and 4 and Problems 5-10
- 1.3 When there are a few minutes eff in Build, review the answers, and respire any misconceptions and eners

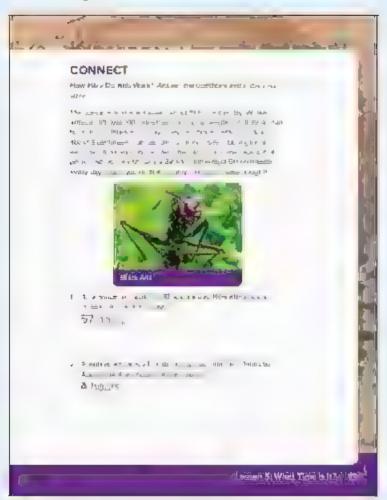
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Student Page 131



CONNECT (7 min)



How Hard Do Ants Work?

- 1 Ask students to turn to LESSON 5 CONNECT How hard Do Ants Work? Ask volunteers to read the para troph aloud
- Discuss the fact that the average worker ant works
 neurs a play
 - How many hours a day do you estimaté you work at school and at home?
 - How many hours a day do you estimate your parents or caregivers work in a day?
- Ask students to use the information in the paragraph to answer the questions.

TF HEP NOTE Comes

WRAP-UP (3 min)

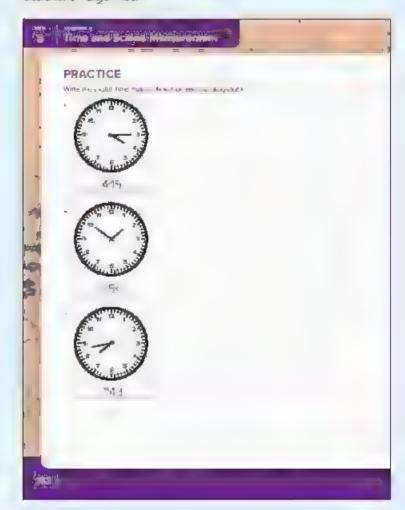
Let's Chat About Our Learning

1. Ask volunteers to smare the strategies and operations thay used to salve the problems

PRACTICE

Direct students to Lesson & PRACTICE and have them complete the problems. Address student errors and misconceptions

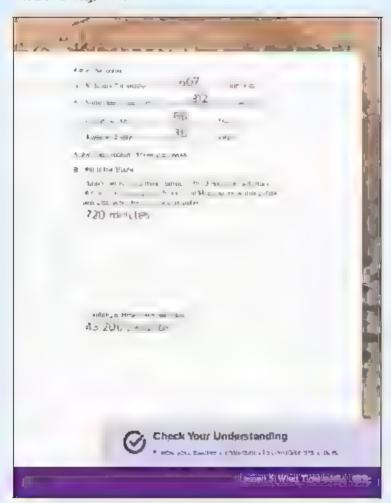
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Student Page 133



Check Your Understanding

Write the time for each clock

- 1 3.50
- 7 42

Fig. in the blanks

- 3. 5 hours 10-minutes = 310 minutes
- 4. 4 minutes 11 seconds = 251 seconds
- 5 3 days 10 hours = 50 hours
- 6. 2 Weeks 2 days = 16 days
- 7 R + 2 1 + 60 420 minutes

Challenge 4 to 62 520 seconds

LESSON 6 How Long Does It Take?

Lesson Overview

In this essen, students explore the concept of elapsed time in pare number problems as well as story problems. Students apply what they learned about converting units of time and explore different strategies to made and solve problems myouring elapsed time.

Essential Questions

- What are the relationsh ps between units of time?
- Which problem-solving strategies are most effective and efficient for me?

Learning Objectives

in this lesson

- Students will explain elapsed time
- Students will solve plapsed time problems.
- Students will explain the strategies they use to some elapsed time problems.

Grade-Level Standards

- 4.D.1.a Demonstrate understanding of relative sizes of measurement units within one system of units including length (millimeters, centimeters, decimeters, meters, complets), mass (grams, programs, tens), capacity (militer and liter), and time (second, infinite, hour, day)
- 4.D.1.b Use the four operations to solve word problems involving distances, intervals of time, iquid capacity, masses of objects, and money



Vocabulary Check-in

conversion, élapsed time, open number line



Materials List

Problem Solving Strategy and on that



Preparation

Create and display a Steps to Solving Story Problems aricher that

Steps to Solving Story Problems

- 1. Orde important humbers and labels.
- 2. Underline questions
- 3. Traw a bex around operation cues.
- 4. Examine the information
 - Whates woower?
 - What is unknown?
 - Wheels we hidden direction?
- 5. Use what is known to answer the higden guitation.
- Use the new information to solve the problem and find the unknown.

DIGITAL



Lesson 6

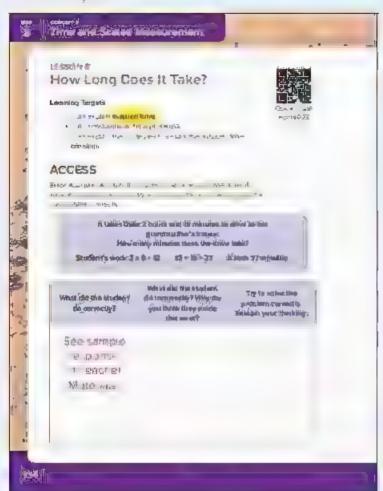
How Long Does



OL or Code: egmt4022



Student Page 134



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may strugg a to cause at elapsed time that requires them to regroup hours and minutes or minutes and seconds.
- Students may be unsure how to write aquations with time
- 5 udents may not have effective strated as for econverting time intervals and solving erapsed time problems.
- Students often confuse regrouping in elapsed time-problems with ragrouping in the Base Tennumber system.

Error Analysis

- Direct students to Lesson 6 ACCESS Error Analysis and ask them to complete the error analysis
- 2. Review the answers as a class

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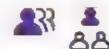
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Lesson 6 - How Long Does It Take?



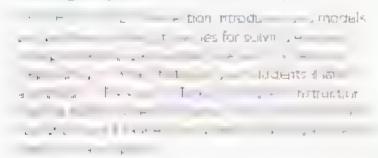
BUILD (40 min)



Passage of Time (15 min)

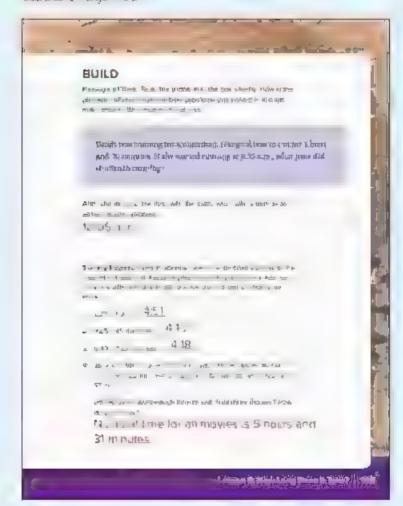
- Ask students to choracy fead today's Learning Targets
- 2 Direct students to Lesson 6 BUILD Passage of Time and ask them to read the story problem's lently
- Ask students to think about how the story problem is different from the kinds of problems they so wed in the last math lesson. Call on students to enall the right high
- 4. The inforce that this problem is not about converting time. We the last lesson, but apout the passage of time or elapsed time. Explain that an equation can be written to represent the problem. Write on the board \$ 15 \(\phi \) 1.30 -= x
- 5 Exprain that we write time in equations using the calon () even if we are representing the passage of time (and not be ing time).
- Ask students to work with a partner to solve the story problem.
- A now Wait Time for students to solve Use Caung Sticks to call on 2-4 students to share their strategies for sowing the problem. Record at strategies on the board

Solving Elapsed Time Problems (25 min)



Draw an open number line on the beard and retord the following problem Gernal has been hiking for 2 hours and 30 minutes lite has 55 minutes more to hike before he reaches the end. How long will his whole hike take?

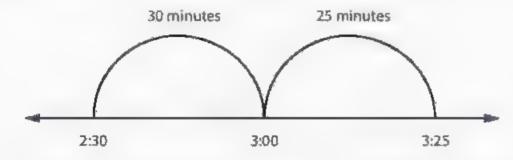
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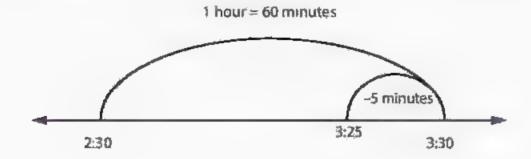
- 2. Ask students to Turn and Talk about how they might solve this problem. Students do not need to determine the answer yet, just discuss strategies to solve
- 3. Use Gailing Sticks to call on 2-3 students to share their thinking
- 4. Mode the following propert solving strategies. Give students as much responsibility as possible for suggesting next steps, especially if they have already demonstrated some understanding of the process. Refer to the Steps for Solving Story Properties and other chart as needed to promote student thanking.

TEACHER NOTE. The following two strategies model opening a restoration in a problem

Make an Heur Complete the hour (30 + 30) and then add 25 injurities (.55 - .30) for a total of 3 hours and 25 injurities



• Start with the Hours: Add an hour (2:36 \pm 1:00 \pm 3:30) and then subtract 5 mirrutes (3:30 \pm 95 \pm 3:25) since 1 hour is 60 minutes



TEACHER (10 & The following two strategies model conversion for the 10 national problem.)

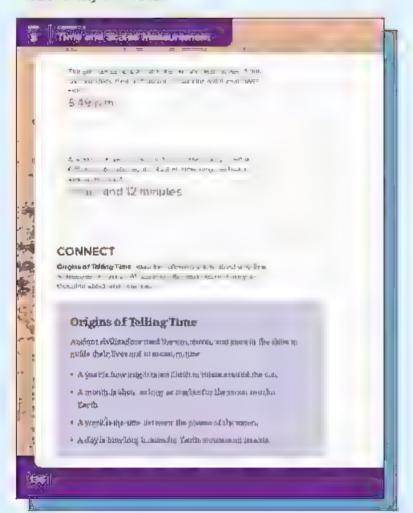
Start with the Minutes Add the minutes 30 = 55 for a total of 85, and then subtract 60 minutes (1 hour)
 2 hours and 85 minutes = 60 minutes 2 hours + 60 minutes = 3 hours
 Answer 3 hours and 25 minutes

2 hr 30 min + 55 min 2 hr 85 min = 3 hr 25 min / \ 25 60

- Convert to Minister Convert 2-hours 30 ministes to 150 minutes, then add 55 minutes for a total of 205 minutes. Convert back to hours and minutes to get 3 hours and 25 minutes 2 hr 30 min = 60 min + 60 min + 60 min = 150 min = 150 min 150 min + 55 min = 205 min = 3 plus remaining minutes $\frac{1}{2}$ $\frac{1$
- Fourt to each strategy and asil students to stand if that problem-solving strategy makes the most sense to them
- 6. Ask students to talk to their Shoulder Partner about how these strategies would work for a subtraction story problem
- 7 Write the following problem on the board: Fatina has to bake chicken for 3 hours and 15 minutes in total. She has 36 minutes left on the timer wow long has the chicken been cooking?
- 8. Ask students to help you solve the problem using one of the strategies you modeled for them. If time allows, ser them to use a different strategy to so we the problem. Ask volunteers to demonstrate the strategy at the board.
- 9 Direct students to pesson 6 Bury DiShiving Flapsac Time Problems to complete Problems 1—5 Students can work independently, in sinal groups, or with the class, depending on their needs
- 10 When there are about 5 minutes left in BUILD, review the answers as a class and clarify any challenging problems



Student Pages 136:137



CONNECT (7 min)



Origins of Telling Time

- 1 Direct students to Lesson 6 CONNECT Or gins of leiling Time. Ask volunteers to read the reading passage a out
- Ask students to share what they not ce and wonder about the origins of te ung time. Encourage students to continue to share and apply their earning about time outside of school.

WRAP-UP (3 min)

Let's Chat About Our Learning

 Ask students to use a Fist-to-Five to self assess their progress toward the Learning Targets

Lesson 6 - How Long Dees It Take?

PRACTICE

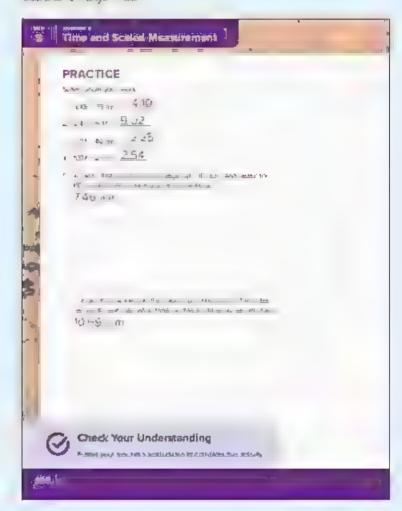
Direct students to Lesson & PRACTICE and have them complete the problems. Address student errors and improving plans around elapsed time.

Check Your Understanding

So we using two different strategies. Show your work.
Accept any strategy that yields a correct answell.

- 1 Am A worked from 7:05 am until 8:52 am How long old Am A work?
 1 hour 47 mm tes
- 2 Ant B started working at 11-25 s m, and worked for 82 mmutes. At what time did Ant B stop working? 12 47 p m
- 3 mow long did Arits A and B work a together?
 3 hours 9 moutes

PRINT









Materials List

 Lesson 7 Image uargest Fossilized Ant (Located at end of yourse)



Preparation

No additional preparation needed

DIGITAL



Scaled Measurements



egittt4023

LESSON 7 **Scaled Measurements**

Lesson Overview

In this lesson, students review line plats to represent a set of measurement data. They create their own the plots with a measurement scale based on a given set of antidata. Then, they are yet the line prots to draw conclusions and answer questions about the data

Lesson Essential Question

 How can I represent and interpret data using a scaled number ne?

Learning Objectives

In this lesson

- Students will create line plots to represent given
- Students will select an appropriate key and scale for tolq eni s
- Students will write questions that can be answered. by that line plots

Grade-Level Standards

4.D.1.c Represent measurement quantities as no diagrams such as number live degrams that feature a meas with ment scare



Vocabulary Check-in

ine plot, scale

Lesson 7 - Scaled Measuraments

ACCESS (10 min)





COMMC AND THE ENTERPREDICTION ERRORS

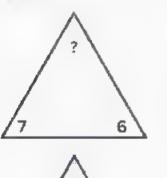
- Students may not understand now to represent data on a line plot.
- Students may not be sure what each X represents on a fine plot
- Students may incorrectly label the scale of a line protek thoose a key or scale that is not appropriate for the data

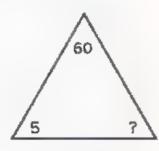
Fun with Facts

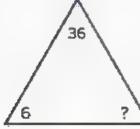
1 Explain to students that they will review the relationship between multiplication and division with fact it angles. Multiplication is an operation we use when convening units of mean, rement.

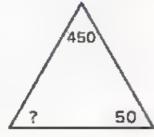
The set of a set as a set of the set of the

2 Draw fact triangles on the board. Examples are shown.

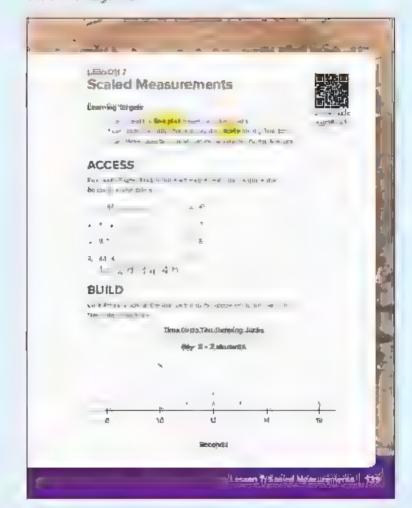




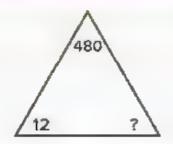




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- 3. Ask students to think quietly and qive a Thumbs-Jb when they know the answer to one or more of the problems. Give Wait Time so that all students have enough time to think about the problems. Call on several students who have their Thumbs-Up and record their answers on the board.
- 4. Ask students to explain their thinking. Record their ideas on the board-so other students can see the problem-so wing strategies their classmates are wring
- 5 Ask students to Turn and falk apout the following question
 - How can knowing your multiplication facts help you know your division facts?
- b. Reinforce the concept that multiplication and division facts are related, are inverse (opposite) operations, and that multiplication and division "fact families" are identical
- 7 Ask students to rum to Lesson 7 ACCESS Fun With Facts and complete Problems 1 4

BUILD (40 min)

333

Line Plots (10 at.n)

- 1. Ask a student to read the Leathing Targets aloud
- 2. Pose the following question and ask students to Turn and Talk
 - If you collected data on how long it took each person in the class to do 10
 jumping jacks, or if you collected measurement data about a collection of rocks
 how could you display that information for others to see and understand?
- 3 Use Calling Strove to choose 2-3 students to share their ideas. Possible answers may not de chart, graph, line port or table.
- 4. Ask students to discuss the difference between a line plot (discussed in depth in Primary 2) and a par graph or a table. If necessary, share any of the following points students did not mention.
 - Bar graphs provide a visual display in a par format to compare quantities in different categories or groups
 - Tables present information quietly in rows and columns.
 - A line plot is a graph that displays data using a number line. It uses X's above each data value to show the number of occurrences

Lesson 7 - Scaled Measurements



Time and Scaled Measurements

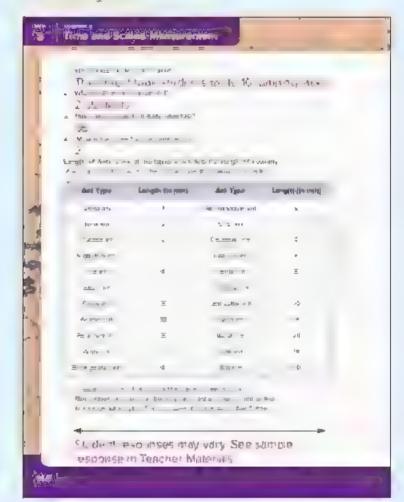
- 5. Direct students to Lesson 7 Bull_D Line Plot Review to look at the line plot as you ask the following questions
 - What does this line plot show? (In 1 me it takes students to do 10 jumping jak is
 - What does each X-represent? Lite 1 mg

 - What is the scale for this number line?
- Review the definition of scale and share the following
 - Seales on number interact ne plots show marks at equal intervals
 - Scares are labeled with numbers and represent real quantities
 - Scales are often used to help represent data and measurements
 - The state represents are attending between the units being used. For example, in the une plot in the Student Edition, the scale represents the relationship between seconds and the actual measurement data that were to lected. The line plot starts at 8 seconds and goes to 16 seconds, counting by 2. The scale is 2.

Length of Ants [0 mm]

- i. Ask students to hold up with their fingers to show their estimate of the average ength of ants. As severa students to estimate how many millimeters (or cent meters) they are showing
- 2 Display the image of the largest fossilized antifound at the end of the volume), read the text a out, and ask students to talk with a partner apout what they notice and wonder
- 3 Direct students to Lesson 7 Build Length of Ants
- 4 Explain to students that the table has measurement data about the length of a variety of ants. Ask the for owing quest ons and have students share their thinking with their Shoulder Partner.
 - What will go along the line?
 - What do the numbers represent?
 - How will you represent the number of arts? Will each X represent one ant or more?

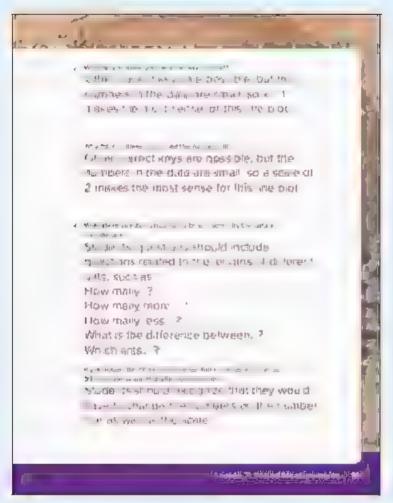
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- What scale will you use? In other words, how will you divide up your line to make sure that the length of the Bull Arit (40 millimeters) can be represented in the space you are given?
- 5. Direct students to deep ay this measurement data on a time plut and then answer the remaining questions. Students could work independently or with a partner.
- b. When 5-7 minutes are left in BunLD, direct students to open their Student Edition to display their line plot. Go on a Gallery Walk spithalt students can see and respond to each other's work

Answer Key for Length of Ants:

Personal Length of Antiher, x see Scale and reporter



Militreters

- Other correct keys are prossible, but the main, eximited data are small so yell maines the minor series for this help of t
- * Ither correct keysa p. s. b- | in the number- h

 me data are are in a size of 2 makes b- m st

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 - training
 - HE W THAT, IT JE
 - · at war and year. "
 - · What same afterers tellinger
 - Alternation
- 5 where is the date on the there is you all don't that he is made in the terms of the second of the

Lesson 7 - Scaled Measuraments

CONNECT (7 min)



Scales Everywhere We Look

- Explainto students that we actually see states everywhere we look. Ask students to think quiet y than raise their hands to share some examples of scales they see in their daily lives and at school Examples may include rulers, meter sticks, clocks, weight scales, scales that measure mass, and maps
- 2 Direct students to Lesson 7 CONNECT Scales Everywhere We _pok to see another example of the use of scales-gradulated cylinders (which students may have ment oned)

Answer Key for Scales Everywhere We Look:

- 1. What title would you use to represent this data? Mudent stylic lesteralities ales to Mayida rt + n mater y rders with as along of in Graduated Cylinders or Graduated Cylinder VOIS TIMES
- . What key would you use to represent this data? - F とサルタ E a simal set of data, stillerty should the the skill of 1
- 3. What sears would you use to except this Students may africise to use a socie of 5 in 10. though 5 is the most appropriate wax

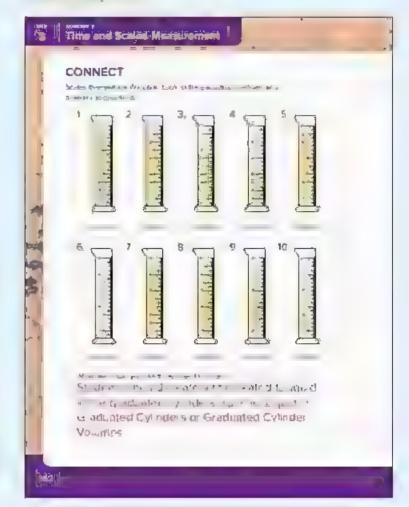
WRAP-UP (3 min)

(Let's Chat About Our Learning

Ask students to discuss how they choose a key and a scale when creating a the plot. Ask questions to promote a scussion, since many students still may not understand how to effect very do this. Remforce effective strategies

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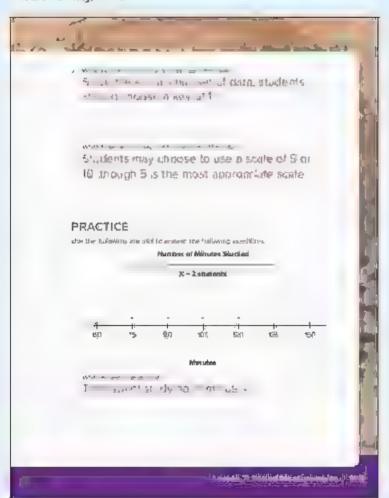
Stillent Page 142







Student Page 143



PRACTICE

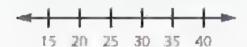
Direct students to Lesson TPRACTICE and have them complete the problems. Address studentierrors and imprenceptions

Lesson 7 + Scaled Measurements 251

3 Time and Scaled Measurements

Check Your Understanding

I' A line plot has a scale of 5. The first number on the scale is 15. There are o marks on the line plot. What is the last number on the line? 40.



2. The key of a line plot indicates that each x = 4 children. One of the data points on the line has 6 X's ripw. many children does that represent?
24 on dret

Kungkamyof d if the Keyna = Tank olung

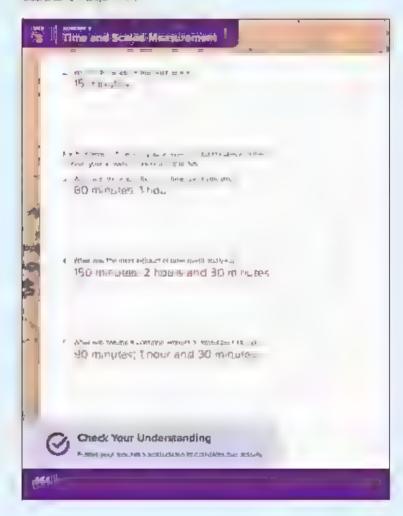


- 4 Ante a gwestron that iould be answered by looking at your interpret at your interpret and error wary but should be answered by looking and error and wary but should be answered by looking at your interpret.
- Write another question that could be answered by booking at your the plot.

 The wers we vary but should be base of the data on the tine prot

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Materials List

Materials may vary



Preparation

No additional proparation meeded

DIGITAL



Concept Check-In and Remediation



Guick Code egr#t4024

Concept Check-In and Remediation

Lesson Overview

in this essent, students work to comectum scoricebtions and errors from Concept 2 Time and Scales Measurements. First, administer the Concept Check. In Once you have rewewen the gatz results, choose remed abon activities based on the needs of your students. Some recommendations are lated below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or in asmall group with the teacher

Lesson Essential Questions

- What are the relationsh ps between units of time?
- What strated as are those effective and efficient for me when so ving problems?
- How can I represent and interpret data with a scaled number line?

Learning Objective

in this lesson

 Students will work to correct misconceptions and errors related to time and scaled number lines

Grade-Level Standards

4.D.1.a Demonstrate understanding of reative sizes of measurement units with none system of units including rength (m. limeters, centimeters, decimeters, meters, cometers), mass (grams, knodrams, tons), capacity (m.) ter and iter), and time (second, infinite, hour, day).

4.D.1.b. Use the four operations to solve word productions much my distances, intervals of time, liquid capacity, masses of objects, and money

4.D.1.c Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale



Vocabulary Check-In

Review concept vecabliany as needed.

Concept Check in and Remediation



COMMON MISCONCEPTIONS AND ERRORS

- Students may struggle to read time or an analog clock. They may confuse the hour and the minute hands or think that the digits on the clock are in-5 minute intervals.
- Students may struggle to ramember the conversions for time how many saconds in a minute, minutes man hour, hours maday days malweek
- Students may not have effective strategles to convertitume intervals and solve a apsed time problems.
- Students may not understand how to represent plate on a liverplot.
- Students may incorrectly tabel the scale of a line pilot or choose a key or scale that is not appropriate for the data.

15...

Then...

Students struggle to tell time on an analog-clock accurately

Revisit the telling time lessons in Primary 3
Review Ratio Tables in Lesson 5. Review the parts of the clock and practice reading and writing time. Consider creating clack faces using paper plates, braids, and paper clock hands. Plave students practice to ing time to the hour, half-hour, quarter-hour, 5 minutes, and minute. Also, reinforce stretching but the clock into a number line that shows the 5-minute intervals.

Create and administer a cibbli fluency worksheet where students have 1 m nute to read and record the time for 15-15 clocks. These can be done periodically to practice and build fluency.

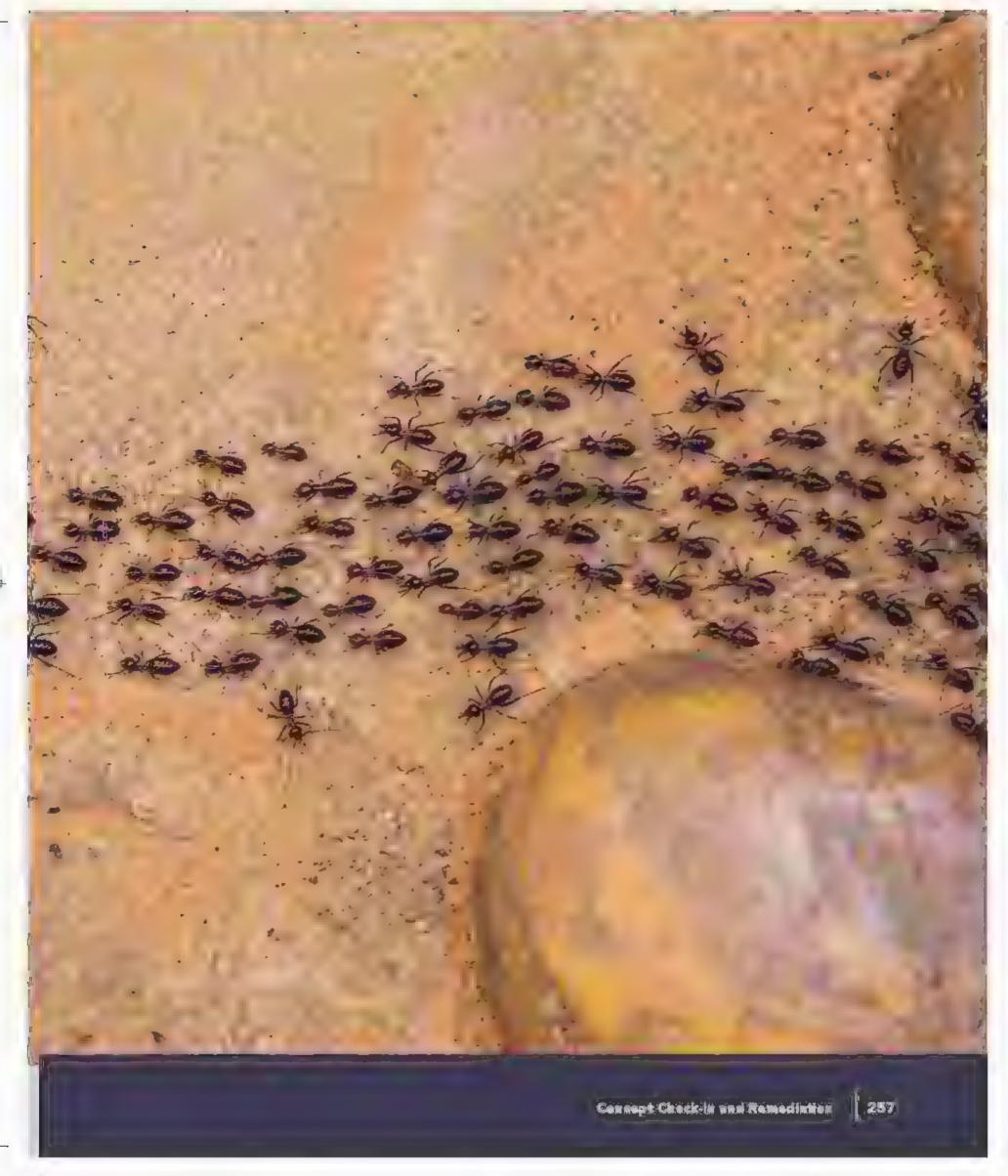
If...

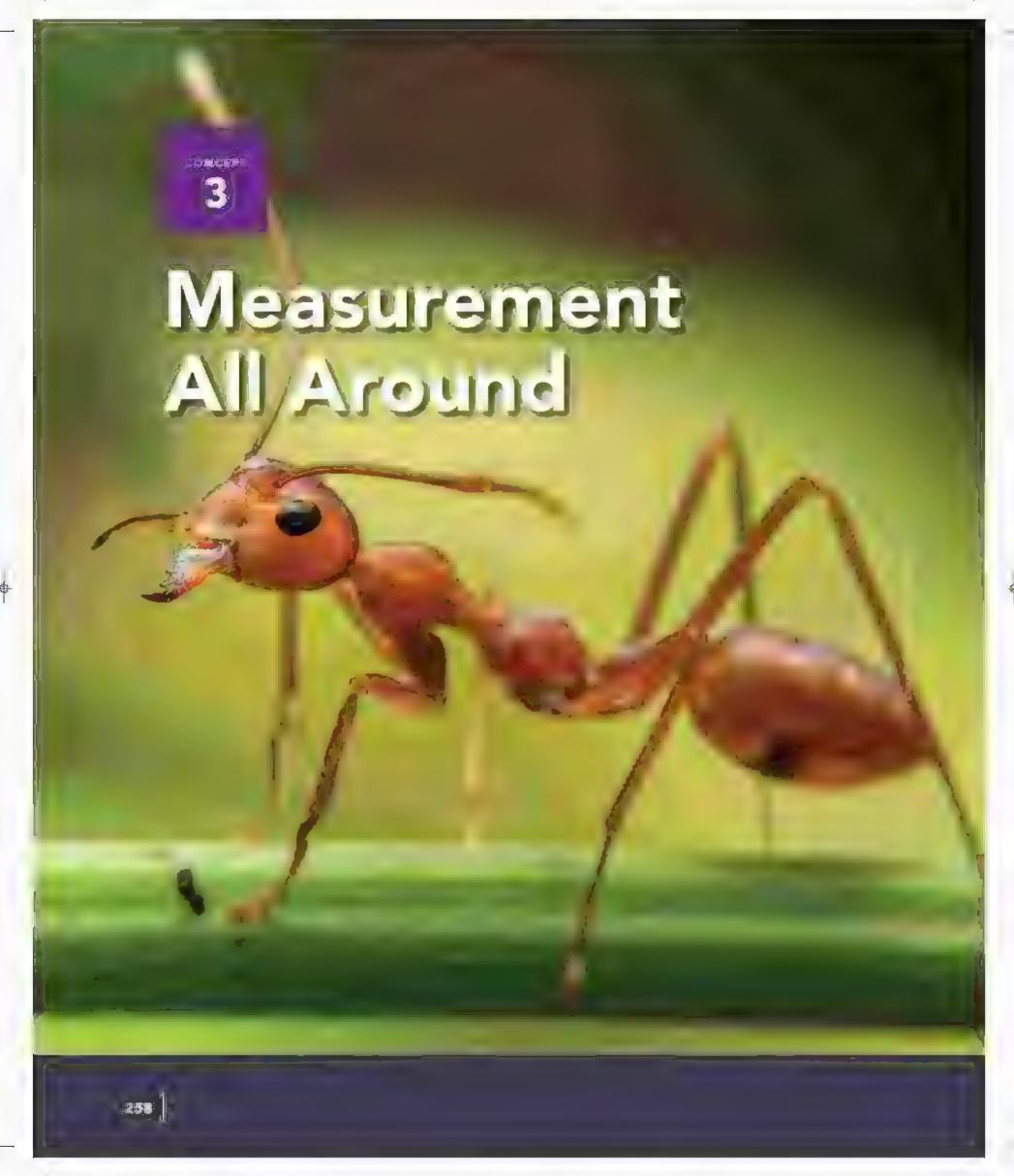
Then...

Students struggle to convert time units

Ray ew Rat o Tables in Lesson 5 Work with small groups of students to create ratio tables and use them to practice simple conversions. Mode for students now to record each step in the conversion process.

Concept Check in and Remediation







Concept Overview

In Concept 3: Measurement A Around students apply the runderstanding of measurement and converting measurement units and apply the four operations to solve a variety of story problems. Multiplication and division are explored in Theme? of Primary 4, so the numbers used for these operations in this initiate appropriate for students to work with at this time.

Concept Standards

4.D.1.b Use the four operations to solve word problems involving distances, intervals of time, gold capacity masses of objects, and money

Concept 3 Measurement All Around

Concept Planner

Lesson	Materials for Lesson	Vocabulary	Learning
Name		Terms	Objectives
8 Measuring the	 Steps to Solving Story Froblems	Review	 Students will add and subtract to so ve problems Students will se we stary problems involving measurement Students will apply a variety of strategies to so ve story prot amb
World around	anchor chart (Displayed) Display other strategy anchor	vocabulary as	
Me Part T	charts you have created	needed.	
• Measuring the World around Me Part 2	Video: Leaf Cutter Ants and Flingus Anchor charts used in Lesson 8	Review wacabulary as needed	 Students will mustiply and divide to solve problems Students will solve story problems livolving measurement Students will apply a variety of spategies to solve story problems
Concept Check-In and Remed ation	Materials may vary	Review concept vecationary as needed	 Students will work to contect misconceptions and errors related to solving measurement story problems using the four operations

Opportunities for Assessment:

in addition to the assessment opportunities included in this chart, each concept will include a Concept Check-in.

Common Misconceptions and Errors

- Students may not have effective and efficient strategies. for problem solving. They may rely on ait me-consuming strategy or one that yields inaccurate so ut ons
- Students may not have flex ble strategies for problem. solving. They may rely on one stratagy aligne, even if that strategy is ineffective or inappropriate for the given prob em
- Students may not have effect se and efficient strategies. for problem solving. They may rely on a time-consuming strategy or one that ye ds naccurate solutions
- Students may not have flex ble strategies for blob em. so ving. They may rely all one strategy alone, even it that strategy is mediective or mappinion ate for the given pliot) em
- Students may not have effective and efficient strategies. for proplem solving. They may rely on a time-consuming strategy or one that yields inaccurate solutions
- Students may not have flex ble strategres for problem. so ving. They may rely on one strategy alone, even if that strategy is melfective or mappropriate for the given problem



Opportunities for Formative Assessment

So Many Strategies, Writing About Math, Practice Check Your understanding

Ant Math, Multistep Measurement, Exit Ticket, Practice, Check Your Understanding

Concept 3 Measurement All Around

LESSON 8 Measuring the World around Me Part 1

Lesson Overview

Think lesson, students use add than and subtraction to solve multistep story problems hydroving ength mass capanity, and time Students demonstrate flex builty using a variety of strategies and reflect times. Strategies and reflect times.

Lesson Essential Question

 Which problem-solving strategies are most effective and efficient for me?

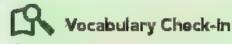
Learning Objectives

In this lesson

- Students will add and subtract to solve problems
- Students will solve story problems involving measurement
- Students will apply a valuety of strategies to solve story problems

Grade-Level Standard

4.D.1.b use the four operations to some wold problems involving distances, intervals of time, i.q. disparity, masses of objects, and money



Review vocabulary as needed.



Materials List

- Step into Solvetta Story Problems anchor chart (displayed)
- Display dural strategy anchor draits you have afeated



Preparation

No preparation needed.

DIGITAL



Measuring the World around Me Part 1



Quick Code egmt4025

Student Page 147



ACCESS (10 min)



THE TALL COME TO THE TALL

ERRORS

- Students may not have affective and efficient strategies for problem solving. They may fely one time consuming strategy or one-that yields inaccurate solutions.
- Students may not have then ble strategies for problem solving. They may say on one strategy alone, even if that strategy is melfective or mappropriate for the given problem.

Take Steps to Solve Problems

- Direct students' attent on to the Steps for Solving Story Problems and or chart. Ask volunteers to read and discuss now each step helps them solve story problems
- 2 Direct students to Lesson 8 ACCESS faire Steps to Solve Story Problems. As instrudents to Work nicependently to solve the problem using the Steps for Solve ig Story Problems. When this hec, have students share their work with a partition to compare solutions.
- 3 Remind students that the steps are simply a process to approach problem solving, and there are many strategies they can use to solve problems.

BUILD (40 min)





So Many Strategies

- Write the following problem-solving strategies on the board for the class to see
 - Est mate
 - Use smaller numbers
 - Draw a picture of miscal (humber line, bar income, diagram, and so on)
 - Write an equation with the unknown
 - "se the standard a gonthrn

Lasson 8 - Measuring the World around Me Part 1

26.

3 | Measurement All Around

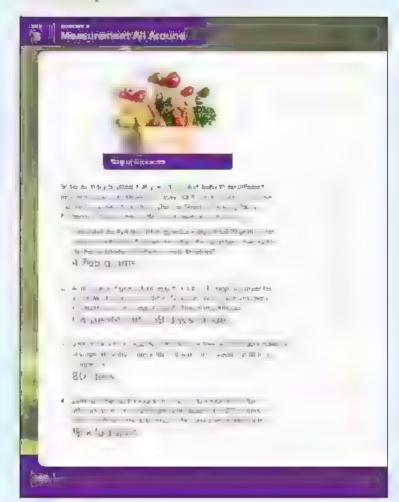
- Find a hidden question
- Convert measurement units first
- Make a benchmark number
- 2 Ask students to add any other strategies they can think of They may refer to other strategy anchor charts on display. Accept all reasonable answers.
- Ask students to identify any strategies they would are to see mode ad again. Take few minutes to review and mode 2–3 strategies, as needed
- 4. Direct students to Lesson 8 BUILD So Many Strategies. Ask students to fill in the blanks to share their favorite and least favorite problem-solving, strategies.
- F. Ask students to discuss the strategies they like to use most often. Encourage students to share the rileason rig. ...s'ng math term no ogy whenever possible.
- Ask students to work with partners or misma groups to solve the story problems in their Student Edit on Encourage students to discuss and try different problem-solving strategies

TEXO TEXTE Stable to may muture we expect time to time a six probe the problem they can dustice texts on any order the particles.

With about 10 minutes left in 8 J.D. regroup students and go over the answers together. Ask volunteers to mode a few of the problem sout ons at the board. Ask students to raise their hands if they tried a new problem-selving strategy today.

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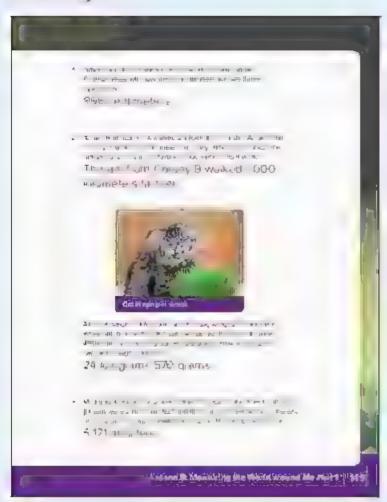




Discuss



Student Page 149



CONNECT (7 min)



Writing About Math

Direct students to Lesson & CONNECT Writing About Math and read the prompt aloud. As I students to respond to the prempt.

I PAS I AS ×* .

WRAP-UP (3 min)



Let's Chat About Our Learning

Ask students to discuss the nexperience solving problems today. What was ona enging? What did they earn? What was surprising to them? How did they fee about trying different strategies? Why?



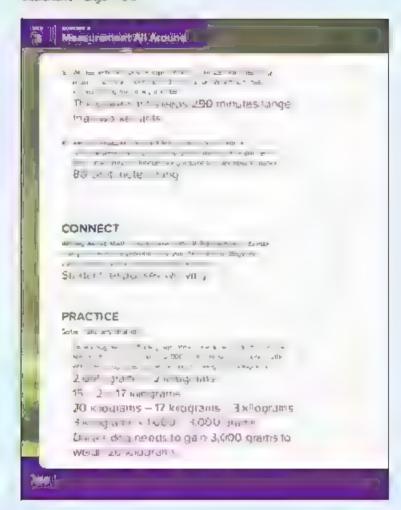
PRACTICE



Direct students to besson 8 PRACTICE and have them as implete the problems. Address student errors and milispenceptions.

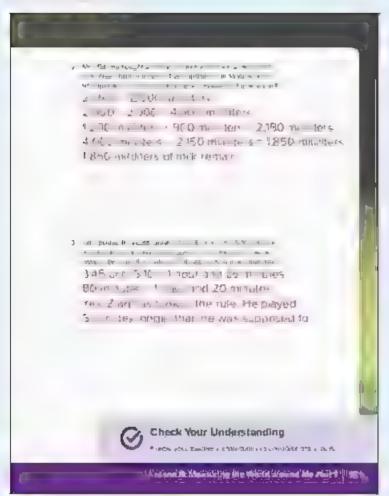
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Student Page 151



Check Your Understanding

Statemes of test of the est states, to so end.

Discount to the test that a section when I is a section wh

- 1 Dallas dog wergns 15 k ograms. When she took her to the vet, she learned that her dog garred 2000 grams. How many indregrams will Dalla's dog need to gain before she weigns 20 king grams? [] a dog needs to dam it is down to we go Zu king are
- 2 Mrs. Basma pought, 2 cartons of milk winigh are 2 liters each interthree children finished 1290 militers on Monday and 950 militers on Tuesday How many militers of milk felhali
- 3 Ziad played his video game from 3.45 p.m. anti. 5.10 p.m. He is only allowed to play video games for 80 minutes. Has the broaten the rule? If no why not? If yes, by now many minutes? The Ziad has proper the rule. He played that he was supplied to

Lesson 8 - Measuring the World around Me Part 1 267

LESSON 9 Measuring the World around Me Part 2

Lesson Overview

methic ressor, students use multiplication and division to some multistep story problems, hydring length, mass and capacity. The multiplication and division problems for a on facts 1–12 and multiples of 10. Students apply a variety of straining es and centify the most effect related efficient ones for them.

Lesson Essential Question

 Which problem sowing strategies are most effective and efficient for me?

Learning Objectives

In this lesson

- Students will multiply and divide to solve problems.
- Students will solvé story problems involving measurement
- Students Winapy a valuety of strategies to solve story problems

Grade-Level Standards

4.D.1.b Use the four operations to solve word prochams involving distances, intervals of time, but disparity, masses of objects, and money



Vocabulary Check-in

Review vocabularly as needed.



Materials List

- Video, Leaf Cutter Ams and Rundub
- Anchor charts used in Lesson 8



Preparation

We add'it onal preparation needed"

DIGITAL



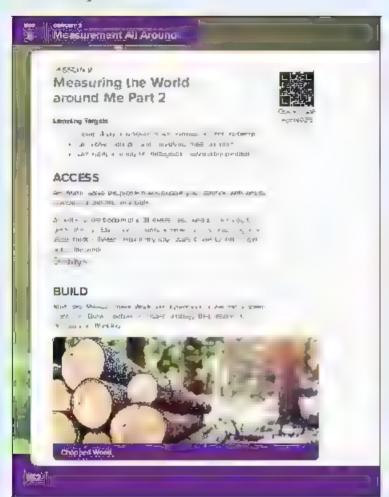
Lesson 9

Measuring the World around Me Part 2



Ou ck Code eamt4026

Student Page 152



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may not have affective and afficient. strategies for problem sowing. They may rew on a time-consuming strategy or one that yields haccurate solutions
- Students may not have flexible strategies for problem so wing. They may rely on one strategy a one, even if that strategy is ineffective or mappropriate for the given problem.

Ant Math

- 1 Direct students to Lesson @ACCESS Ant Math. Read the directions aloud. Ask a volunteer to read the story problem about, Give students a few minutes to some the problem
- 2. Use Calling Sticks to choose 2–3 students to share the'r approach to sowing the question



3. Reinforce the importance of clearly understanding the assumptions pehind problems by drawing a picture or mode in this problem, the antidoes not have to fall back on the lifth day

Answer Key for Ant Math:

If takes the ant Pidays to defile 2 in election in the due of the wall. Citudents do hot lake to deste a table to solve this problem! A table is used here the strate the shabte

Lesson 9 - Measuring the World around Me Part 2 | 269

3 Measurement All Around

Day	Distance Climbed	Distance Fallen	Total Distance Traveled
1	4 meters	2 meters	2 meters
2	4 meters	2 meters	4 meter
3	i weet	2 meters	5 种色母5
1	· 제는 1골() *	2 (neters	Z m-lais
핕	· (4. Ž +4 ()	_ meter	Ψ _{nac} 11 ^[++r]
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Ģ	4 imeters	D Imeters	July a State to 1 July

BUILD (40 min)

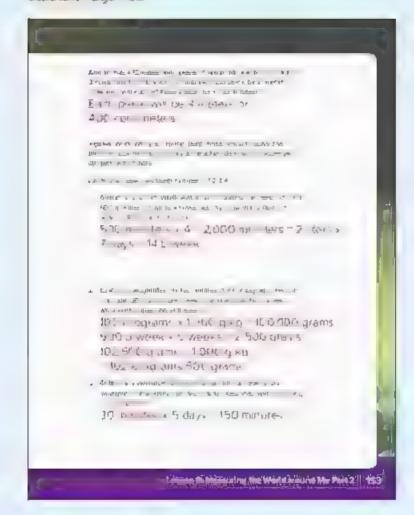


Multistep Measurement (10 min)

- Ask students to turn to Jesson 9 Bury D Multistep. Measurement and read the directions and story propiers silens,y
- 2. As the following questions to prompt thin ing about the story problem.
 - What can your draw to help you solve the problem?
 - Can you solve this problem in one-step, or will it take more than one step? How do you know?
 - What operations do you think you might use to solve the problem? Why do you think so?
- Choose one pair of students to some to the board and work out the problem together. Ask seated students to work with a partner to some the problem on their own.
- 4. When ready, direct the pair of students at the poard to share the resolution and problem-solving strategy with the class.
- 5 Encourage the seated students to ask questions and provide feedback to the students at the board Ask students to discuss any different strategies they used to so we the problem.

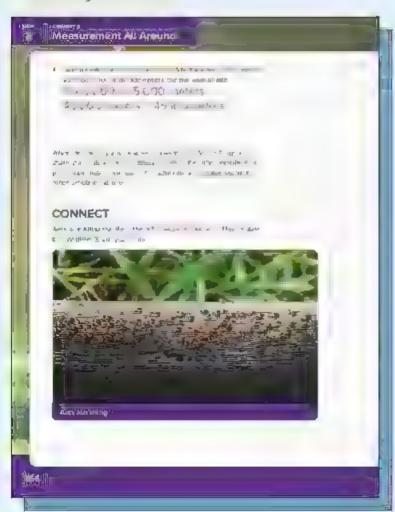
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Student Pages 154-155



- 6 Ensure a students have recorded the correct answer.
- Asir the for owing question and a low severa. students to respond
 - How do you know what strategy to use to solve problems? How do you choose which strategy you will use?

Jigsaw (30 mm)

- 1 Greate straining roups by counting students off by four (in other words, the first student is 1, the second student is 2, the third student is 3, the fourth student is 4 the fifth student is 1 the sixth student is 2, and so on unit is a students have an assigned number? Put all the 1s together 2's together, 3's together and 4's together. These are students' "home feares."
- 2. Ask students to turn to Lesson 9 BuilDuigsaw
 Assign each group the corresponding problem
 in Lesson 9 BUID lingsaw Students should won
 together to solve their assigned problem.

FaithFRNOTE is makers skoud make solution to the regions the condition of the regions to the regions to the regions to the regions to the condition to the condition of the cond

- 3 After student groups have so yet their problems he pistudents recingar as into new groups (called "Shale Teams") so that each new team has a "student, a 2 student, a 3 student and a 4 student
- 4 Give each student in the group a few minutes to teach the other students in their "Share Fearin" how they solved them assigned problem. Encourage the group to ask clarifying questions so they ar derstand the problem solving strategies and solution being shared.
- 5 When a few minutes are left in B1. D, review a answers and clarify any ingering in sconceptions

Lesson 9 - Measuring the World around Me Park 2

CONNECT (7 min)



Ants Are Amazing

- 1 Direct students to Lespon 9 CONNECT Arite are Arriaging Ask volunteers to read the passage a built Asi, students to briefly share what they notice and Wonder
- 2. Show students the video Leaf Cutter Ants and Pungus
- 3 Ask Students to some and em 1

(EAC) # 4 NOTE Coned statuents founds and माना है है है के अपने कर जिल्ला के अपने स्थापन कर है कि स्थापन स्थापन के अपने कि स्थापन के अपने के अपने के अपन may head additional and it on and practice ect a strategies that weld a connect absiver

WRAP-UP (3 min)



Let's Chat About Our Learning

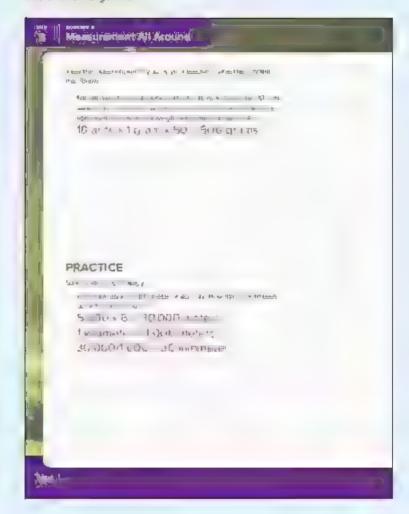
Ask students to self assess their progress firths white using a Fist to Five Ask vo unteets to share their reasons for their self assessment

PRACTICE

Direct students to Lesson 9 PRACT/CE and have them complete the problems. Address student errors and misconceptions

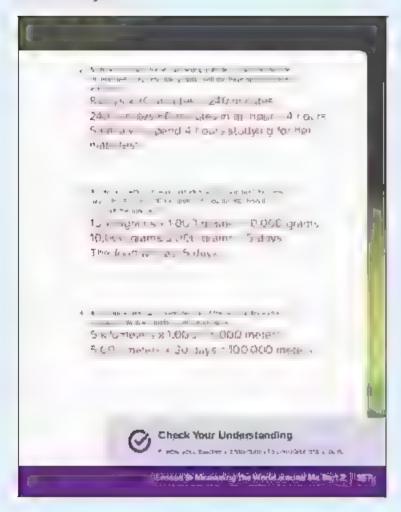
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Student Page 156





Student Page 157



Check Your Understanding

accept all strategies that yield a correct ar siver

- 1 Ants was about 5,000 meters each day. Flow many sulometers do ants walk in 6 days?
- 2 Samura is studying for an upcoming math test if she studies for 30 minutes a day how many hours will she have spent studying in 8 days?

 am raw 1 spend 4 hours studying for her math test.
- 3 A colony of aritis eats approximately 2,000 grams of food each day. Fithe anti-have 10 ringrams of food stored now many days will the food last?

 The time is and fitting.
- 4. An art thay waik up to 5 k coneters per day if the art continues this for 20 days, how many meters will the ant wait?

 Too oco meters

Concept Check-In and Remediation

Lesson Overview

In this essent students work to correct misconceptions and errors from Concept 3 Measurement A. Around First, administer the Concept Check-in. Once you have reviewed the quiz results choose remed allign activities based on the needs of your students. Some recommendations are isted below, but the needs of your particular students should inform your chic ces Students may work independently, in pairs, or this sima group with the teacher

Lesson Essential Question

 Which problem-solving strategies are most effective and efficient for me?

Learning Objective

in this lesson

 Students will work to correct misconceptions and errors related to solving measurement story problems using the four operations.

Grade-Level Standard

4.D.1.b Use the four operations to solve word problems involving distances, intervals of time, ...quid capacity, masses of objects, and noney



Vocabulary Check-in

Review concept vogabulary as needed.



Materials List

Materials may vary



Preparation

No additional preparation needed

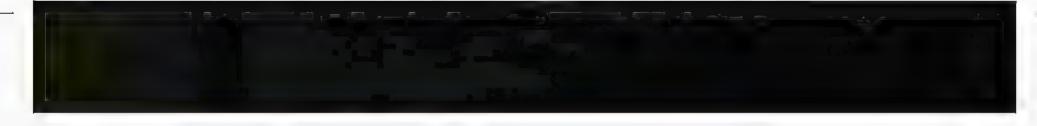
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Concept Check-In and Remediation



Ou ck Code



COMMON MISCONCEPTIONS AND ERRORS

- Students may not have effective and efficient strategies for problem solving. They may
 rely on attime consuming strategy or one that yields in accurate so utions.
- Students may not have flex ble strategies for problem solving. They may jely but one strategy abuse, even it that strategy is mellective or inappropriate for the given problem.

Concept Check-In and Remediation



Remediation: Correcting Misconceptions

l£...

Students do not have effective or efficient strategies for problem solving

Then...

Review 50 Many Strateg es from
Lesson 8 and Multistep Measurement
from Lesson 9. Drawing the problems
prevides an important visitable. c
facultate student thinking about the
mathematical relationships among the
strategy is now to use the numbers
and now you use the numbers to so ye

ţ£...

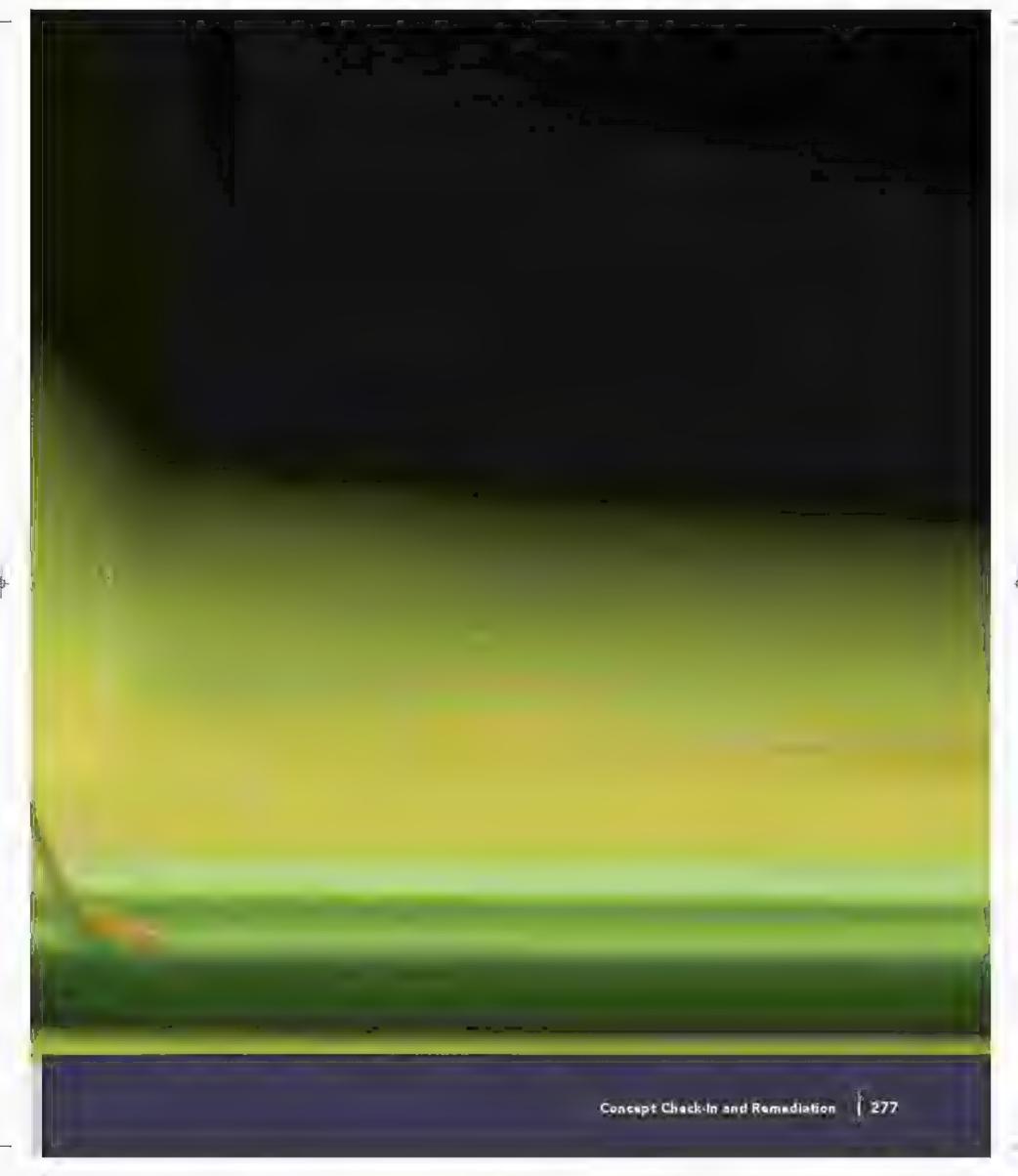
Students are having difficulty with the conversions for length, capacity, or mass

Then

Review Metric Units from Lesson 1

Review Decomposing and Renaming from Lesson 3

Review Mass Review from Lesson 2



UNIT

4

AREA AND

Theirie I Nillinder Tentre duel Spercifiche

Unit 4 Area and Perimeter

ESSENTIAL QUESTIONS

- related?
- Toy can lefficiently solve area







Area and Perimeter

Unit Storyline



Unit 4 Area and Perimeter Storyline

The Area and Perimeter unit extents students' working knewledge calculating the perimeter and area of polygons. Students apply these understandings to the application of formulas for area and perimeter to solve an unknown dimension innertangles and squares and to solve real-world problems. To support learning, students observe video footage and investigate problems of arits within the environment to enhance students' knowledge of area and perimeter.

Unit Standards

4.D.1	Solve problems moveling measurement and conversion of measurements
4.D.1.d	Apply the area and perimeter formulas for sectangles in real world and methematical problems

Unit 4 Structure and Pacing

If Mathematics instruction is based on 60 minutes/5 days a week, deliver the lessons as written in the Teacher Edition.

Concept 1: Explore Area and Perimeter

Essential Questions

- How are area and per meter related?
- · How can 1 efficiently solve area and perimeter problems?

Marching Ants

Learning Objectives

- Students wr. define perimeter.
- Students will use formulas to calculate the perimeter of rectangles.

Lesson 1

Students will explain now to da culate per meter

Student Learning Targets

- can define permeter
- · I can use formulas to calculate the perimeter of rectangles
- Lean explain how to calculate perimeter

Fill the Space

Learning Objectives

- Students w., define area.
- Students will use formulas to calculate the area of rectangles.

Lesson 2

Students will explain how to taleulate area

- Student Learning Targets

 I can define area
 - I can use formulas to calou ate the area of rectang es
 - can explain how to calculate area

Unit 4 Area and Perimeter

Area and Perimeter

Unit Structure and Pacing cont'd

Something is Missing!

Learning Objective

Lesson 3

Lesson 4

Lesson 5

 Ştudents will use formulas to calculate unknowns when given some dimensions of nectangles

Student Learning Target

 Lean use formulas to calculate un knowns when given some dimensions of rectangles.

Odd Shapes

Learning Objectives

Students will calculate the area and permeter of complex shapes

Students will explain their strategies for finding the area and perimeter of complex snapes

Student Learning Targets

- "can find the alea and perimeter of complex shapes
- "can explaining strategy for finding area and perimeter of comp or shapes

Growing Dimensions

Learning Objective

Students will use area and perimeter formulas to so ve multiplicative comparison propiers

Student Learning Target

 tan use area and perimeter formulas to solve multiplicative comparison problems

Concept Check-in and Remediation

Learning Objective

 Students will work to correct misconceptions and embrs related to area and penmeter

Student Learning Target

Lean correct my misconceptions and errors related to area and perimeter

Alternate Pacing Guides

If Mathematics instruction is based on 45 minutes/5 days a week, do the following:

Reduce ACCESS by 3 minutes

Require Buil D by 8 minutes

Real, se CONNECT by 2 minutes

Reduce WRAP-LP by 2 minutes

Strategies for reducing time in each section:

- Eliscuss fewer examples
- · El minate Shou der Partner conversations
- Shorten class discuss ons
- Work with students to complete ACCESS problems

If Mathematics instruction is based on 45 minutes/4 days a week and 90 minutes 1 day a week, do the following:

Follow the 45 thinute approach for the 45-minute days

Teach two 45-minute lessons on the 90-minute day

If Mathematics instruction is based on 90 minutes/5 days a week, do the following:

ncrease ACCESS by 5 minutes

Increase BU , D by 20 minutes

Increase CONNECT by 3 minutes

merease WPAP-oP by 2 minutes

Strategies for increasing time in each section:

- Discuss additional examples as needed
- Extend class discussions
- · Anow time for hands on work with man pulatives and models
- Proy de additional practice problems for students who need additional practice
- Encourage students to share and mode, their problem-sowing strategies

Unit 4 Area and Ferimeter

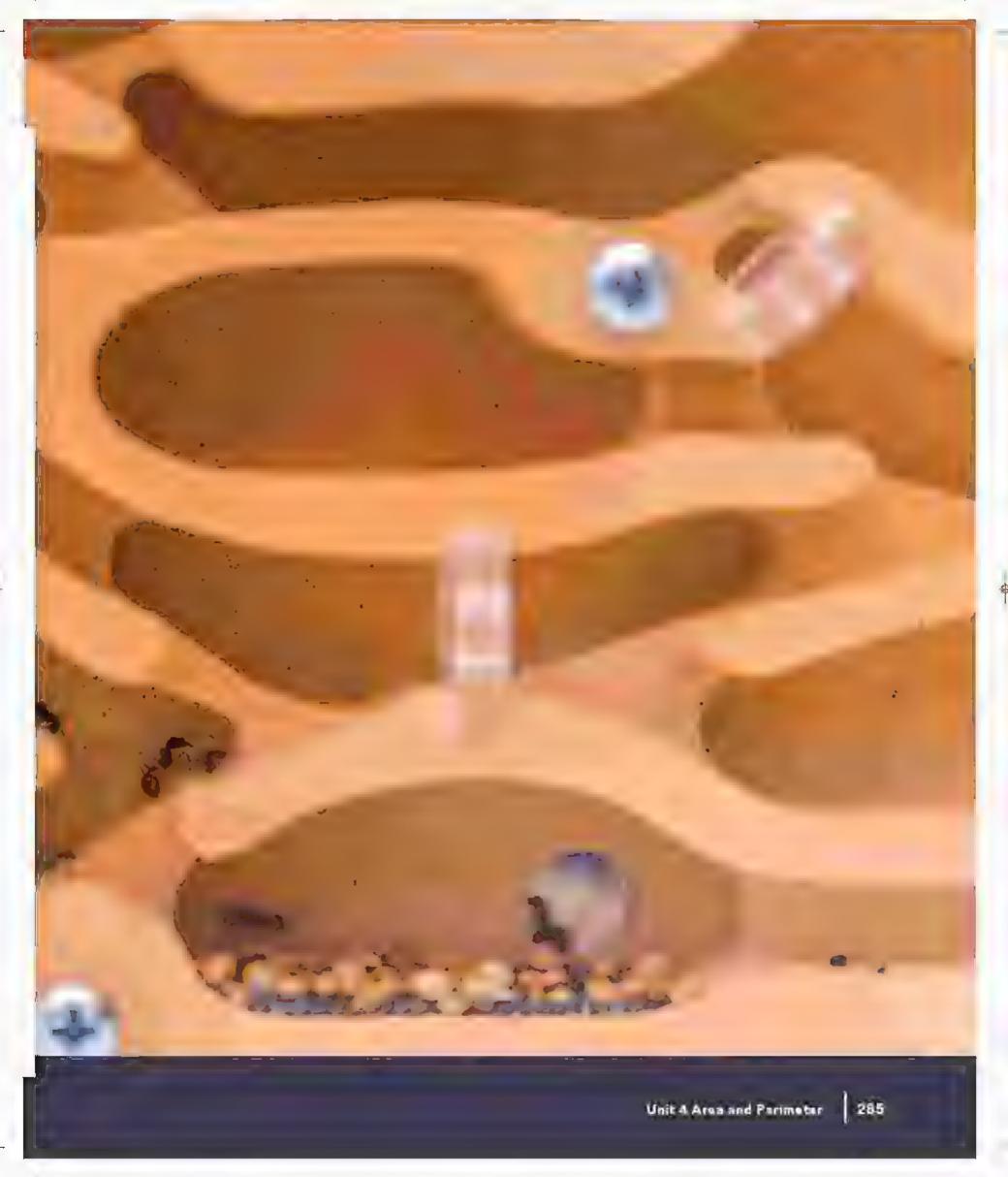
Area and Perimeter

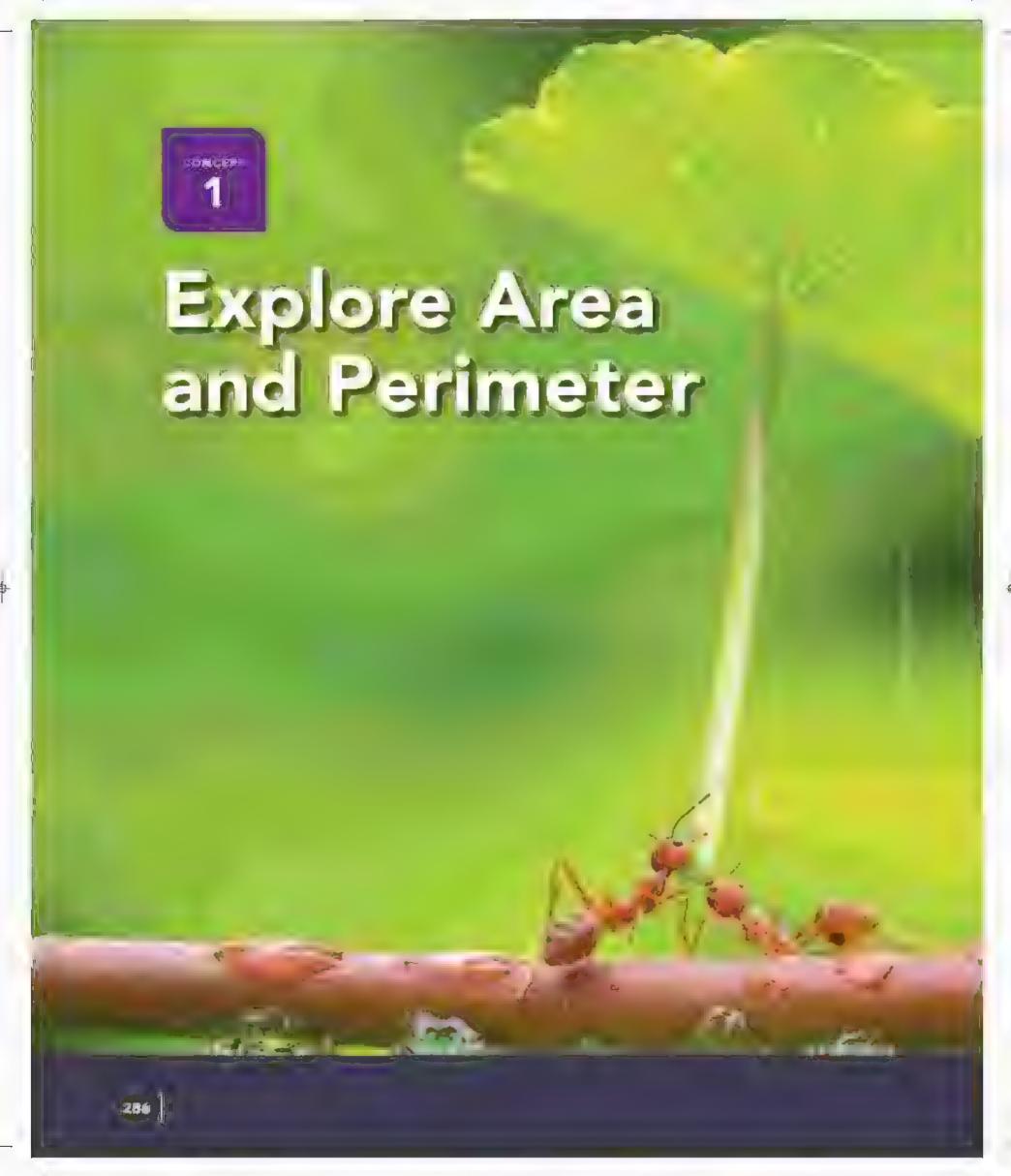
Mathematical Background Knowledge

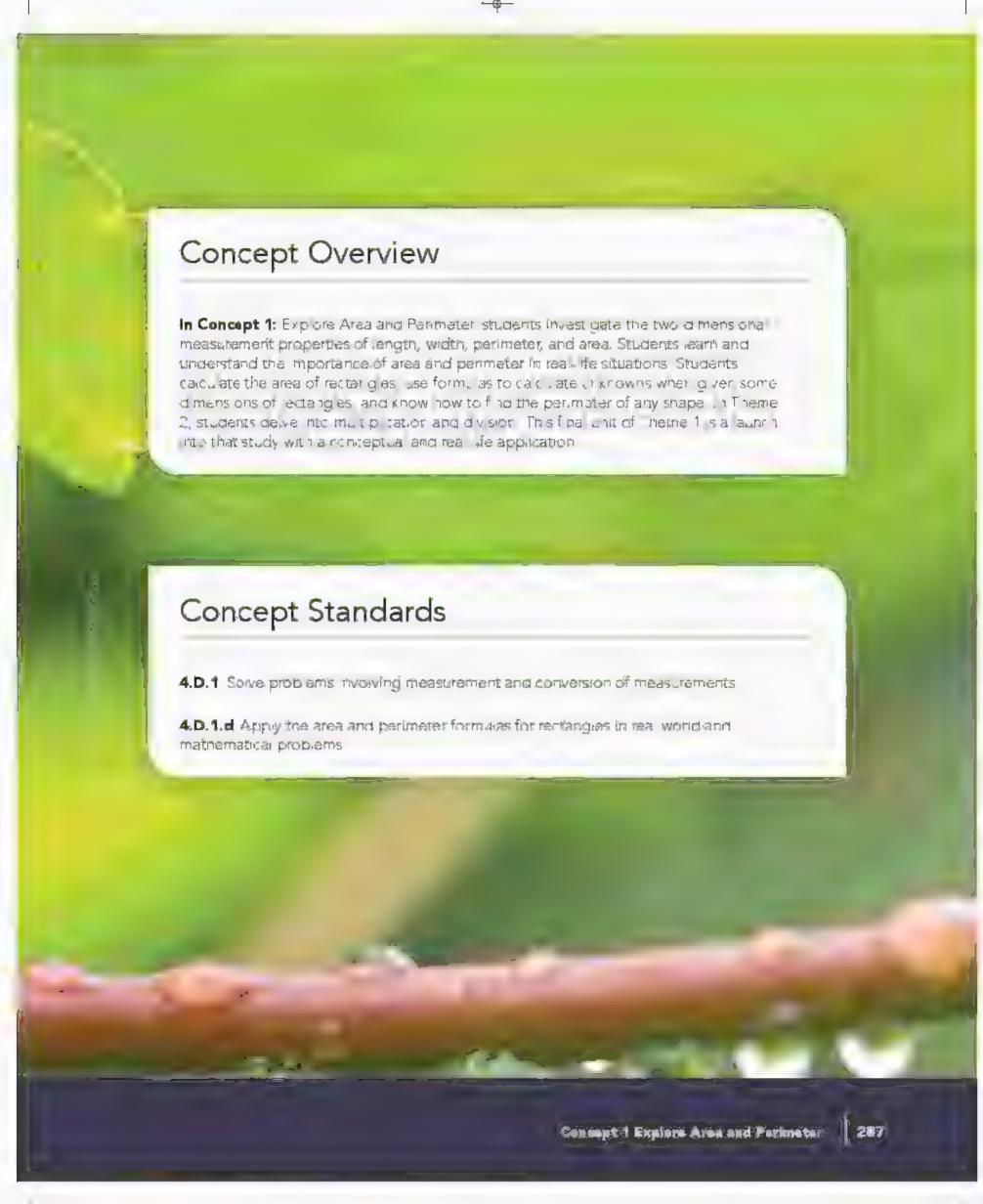
Area and Perimeter

of Primary 3, students calculated the area and perimater of quadrillateras. They solved for area and per meter in both pare number problems and story problems. They calculated the perimeter of other polygons including trapeziums and compound shapes. Although students were exposed to formulas for finding area and per theter, the formulas were not formulas to determine the area of rectanges and extand this knowledge by creating formulas to determine the area of any rectangle or squares. They review area and create a formula (I × w) that they use mounting to determine the area of any rectangle or squares.

Students in Primary 4 apply formulas for area and perimeter to solve for an unknown dimension in rectangles and squares and to solve real world problems. Students review strategies, identify the formulas for both area and perimeter, and calculate unknowns when given solve dimensions of the rectangle. They also solve multiplicative comparison problems hypothing area and perimeter.



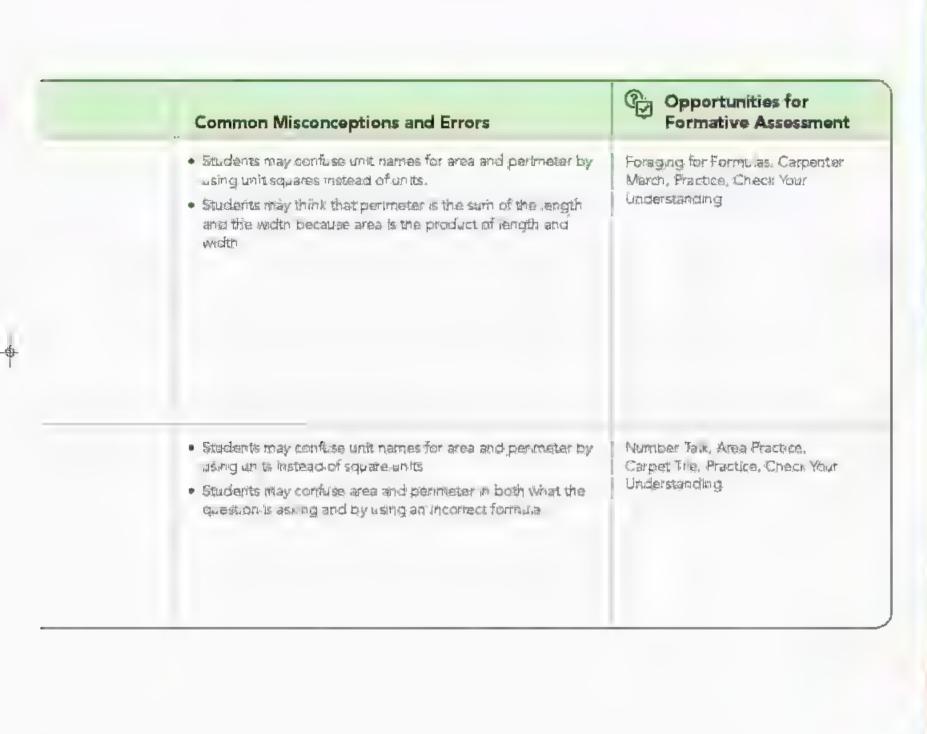




Concept Planner

All lessons are designed to be 60 minutes. The materials fisted in this chart are items to gather for each group. Items for the class or for individual students are indicated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
1 Manching Ants	Large vers on of the Berimeter Earmules for Rectangles anchor chart Perimeter Formulas for Rectangles F = 21 + 210 F = 1 + 1 + 10 + 10 F = 4s (Square on y where s side) Thinking Like a Mathematicum anchor chart	Formula Tength Per metal Quadr latera Scale Sum Wistin	 Students will define perimeter Students will use formulas to salou ate the perimeter of rectangles Students will explain how to calculate per meter
2 門,the Space	Large version of the Area Formilla for Rectangles anchor chart Area Formula for Rectangles A = 1 × W	Area I engin Two- dimensiona Width	 Still dents will define alrea Students will use formulas to calculate the area of rectanges Students will explain how to calculate area



-

- 3			

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
Something s Missingl	Init 4 Lesson 3 SCOOT cards (it cand per pair of students) (Photocopy the Brackline Master at the end of the volume.) Unit 4 Lesson 3 SCOOT answer key (At the end of the volume)	Area Diniensions Formula Perimeter Unknown	Students will use formulas to calquate uninowns when giver some dimensions of rectangles
Ödd Shapes	The A Lesson 4 Shape Cards (I card per suident) (Milotocopy and cut apart cards)) Sc. 55015 Tape	Area Complex Perimeter	Students will calculate the area and perimeter of complex shapes Students will explain their strategies for finding the area and perimeter of complex shapes
Growing Dimensions	Cut six 10 cm × 10 cm squares out of colored construct on paper (1 set for the teacher) Taps	Array Multipricative comparison Square units	Students use area and per meter formulas to solve multiplicative formparison problems.

- Students may incomedly use the area and perimeter formulas.
- Student may overdeneralize or under deneralize the definition of area and/or perimeter situations. For example,
 - o Student interprets at "wall painting" problems as area, even if the problem take about the length of a striped border that is painted around the room
 - o Student interprets all "fance" problems as per meter, even if the problem taks about the size of the garden that the fance encloses
- Students may struggle to break a more complex shape into squares or rectangles in order to colouiste area and perimeter.
- Students may struggle to calculate missing side langths in a complex shape (since not averything is aboved)
- Students may miscalculate perimeter if there is an
 overlapping side in a complex shape. They may add a
 sides to find perimeter but net recognize that some sides
 are within the inequilar shape.
- Students may not realize that multiplicative companisons
 focusion companing two quantities by showing that one
 quantity is a specified number of times larger or smaller than
 the other.
- Students may think that ar shapes with a given perimeter have the same area or that ar shapes with a given area have the same perimeter

(P)

Opportunities for Formative Assessment

Error Analysis, Mystery Dimension. Compound Shape Chailenge, Practice, Check Your understanding

Carculating Crazy Shapes, Writing About Math, Practice, Check Your Understanding

Big Arits, Sma., Arits, Pichic at the Paril, Writing About Math, Practice, Check Your Understanding

Cancept 1 Explore Area and Parimeter



Lesson	Materials for Lesson	Vocabulary	Learning
Name		Terms	Objectives
Concept Check-th and Remediat, on	Mater are may yary	Review concept vocabulary as needed.	Students will work to consect misconceptions and enters is, steel to area and perimeter

Opportunities for Assessment:

inradd tion to the assessment opportunities included in this chart, each concept will insit de a Concept Check-in



- Students may confuse area and perimeter
- · Students may overgeneralize on under deneralize the definition of wear angler perimeter salutions. For example,
 - o Students may not realize that multiplicative comparisons focus on comparing two quantities by showing that one quantity is a specified number of times larger or smaller then the other
 - o Students may think that all shapes with a given per meter. have the same area or that a , shapes with a given area have the same perimeter



Opportunities for Formative Assessment

Concept 1 Explore Area and Parimeter

LESSON 1 **Marching Ants**

Lesson Overview

in this essen, students review how to find the perimeter of a rectandie with visual models and learn and apply the formula for calculating per meter. They review the definition of a quadriatera and discuss why a square is a special type of rectangle. They apply their anderstanding to story problems

Lesson Essential Questions

- How are area and perimeter related?
- How can efficiently solve area and perimeter phob ems^a

Learning Objectives

in this lesson

- Students will define permeter
- Students will use formulas to calculate the parimeter of reattangles.
- Students win explain how to calculate perimeter.

Grade-Level Standards

4.D.1.d Apply the area and permeter formulas for rectangles in real world and mathematical problems



Vocabulary Check-in

formula, length, perlimeter, quadrilatera, scale, sum, Wath



Materials List

Large version of the Perinteter Forthunds for Rectangles anchor chart

Perimeter Formulas for Rectangles

F 21 + 2"

F .t. + W + W

P-2 . (1+ w)

F=4s (Square only, where see side)

Thinking Like a Mathematician and or chart.

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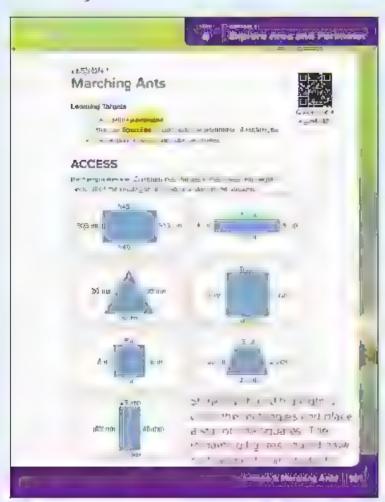


Marching Ants



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PRINT Student Page 161



ACCESS (10 min)





COMMON MISCONCEPTIONS AND ERRORS

- Students may confuse unit names for area and perimeter by fishing unit squares instead of units
- Students may thank that portreter is the sum
 of the length and the vidih because area is the
 product of length and width.

Rectangle Review

- 1. Ask students to turn to Lesson 1 ACCESS Rectangle Review and complete the activity
- 2. Tell students that the images drawn in their Student Editions are mode is that are not drawn to scale. That means that the measurements on the squares are not accurate. They are representative of larger measures that we could not print on paper They need to pay attention to the measurements and abe sign each side.
- 3 Engage students prominowedge by asking questions about shapes, such as



- How are rectangles and squares similar?
- How are rectangles and squares different?
- Can a square be a type of rectangle? Why
 or why not?
- Is a rectangle always a square? Why or why not?
- How would you define a rectangle?
- How would you define a square?

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Lessen 1 - Marching Anti

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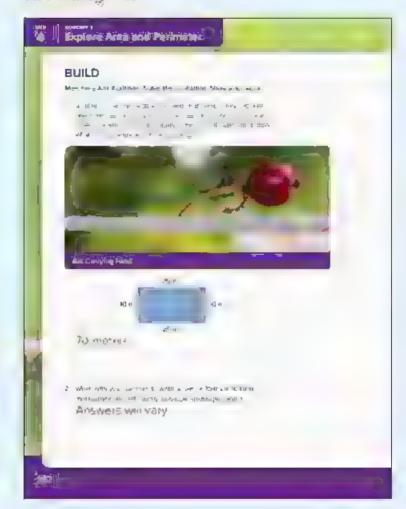
BUILD (40 min)



Marching Ant Addition (20 mm)

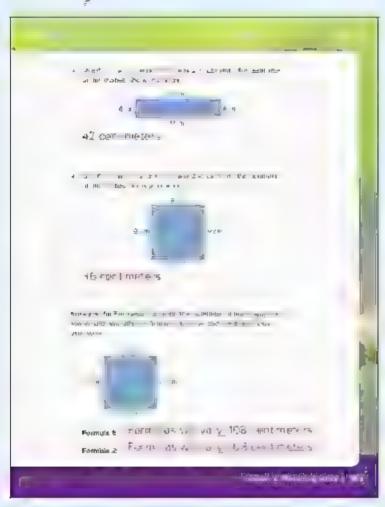
- 1 Direct students to the Lesson 1 BULD Mart, ing Ann Add ton Chara y read the Learning Targets and use students to do a Fishto-Five to self assess what they remember about permeter
- 2 Use Calling Sticks to choose a few students to share what they remember about perimeter. Reinforce that per mater is the distance around a shape
- 3 Tell students that a formula is almostrernatical rule or relationship, expressed in symbols or etters that can be used to solve any problem. Formulas often make problem-solving more efficient
- 4 Ask students to solve Fab end 1 in their Student Edition. Tell students to remember how they solved the problem so they can explain it.
- 5 After a few minutes, ask students to discuss their grob em-selving Strategy and answer with their Shoulder Partner Ask volunteers to share their strategies with the class
- 6. Ask students to work with their partner to so ve Problem 2
- 7 After a few minutes, ask volunteers to share the formula they created. Record all formulas and chacuss students' deas as a class.

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- 8. Write the formula P = I + w + I + w on the board Explain that the P stands for conmeter, the I for length and the w for width. Ask students to compare the perimeter formula to their own formulas.
- 9 Ask students to solve Problems 3 and 4
- 10. Ask valuntaers to show their work on the board
 Ask students if any of them added the numbers in a
 different order D.d they get the same answer? Why?
 Remforce that when we calculate permeter, the
 order in which we add the sides does not matter

Foraging for Formulas (20 mm)

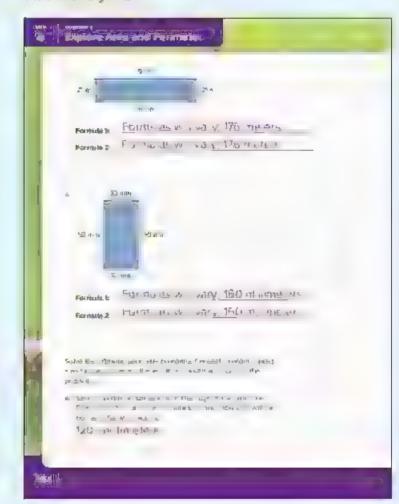
- Asv. students to laak again at Problems 3 and 4 Challenge students to come up with a formula for parimeter that uses multiplication
- 2 Give students a few minutes to explore strategies
 Ask students to share what they discovered. Record
 their strategies on the board. For each strategy
 ask students if it would wark every time and if the
 Strategy is efficient. Discuss
- 3 Introduce the Perimeter Formulas for Rectangles anchor chart. Asi, students to compare what they discovered with the formulas on the poster. Clarify any misconcept ons or confusion

- 4. Reinforce that there are several formulas to calculate per meter for rectangles. The last formula on the anchor chart only works on squares since the sides are at the same ength. Remind students that we can always aportio each sie perimeter.
- 5 Direct students to complete Problems 1-4 in Lesson I Bull Di Poraging for Formulas Remind students that they will need to try at least two different formulas from the anchor chart to solve Problems 11.3
- b. During the last 2-3 minutes of 8-111, review the answers as a class. Ask students to discuss the efficiency of the strategies they thed

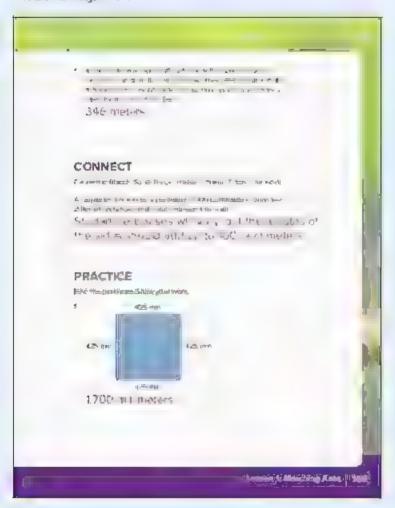
Answer Key for Foraging for Formulas:

- 1 1 ¹² ভ, 1 শ লো সারু
 - 1 A Destada
- · [80] [5,] p -st -r |
- ♦ 120 centimeters
- 5 Pit meta

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CONNECT (7 min)



Carpenter March

- Direct students to Lesson 1 CONNECT Carparter
 March to read the problem
- 2. Ask students how this type of problems is different than the other perimeter problems they have salved. Reinforce that the perimeter is given but the sides are not. Ask one or two students to share their thinking about possible strategies for determining the lengths of the sides.
- Ask students to work independently to solve the problem.

EACHER NOTE Consider any this activity as formetive assessment to determine which student need additional support

WRAP-UP (3 min)



Let's Chat About Our Learning

- 1 Ask students to think about the statement from the Thinking Live a Mathemat can anchor chart can use what motice to explain rules and shortcuts when solving problems
- Ask students to talk to their Shoulder Partner to enswer the following



- How is a formula a mathematical shortcut?
- Which perimeter fermula do you think is most efficient and why?
- Use Calling Stocks to select students to share their thinking with the class

PRACTICE

Direct students to 'Lesson' † PRACTICE and have them complete the problems. Address student errors and Intraconceptions

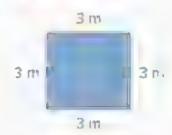
Check Your Understanding

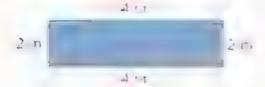
Find the perimeter Show your were

- 1 1 606 certi, ritie ert.
- 2 4808 m., meters
- 3 Find the per meter of each restangle. Circle the larger rectangle and explain your thinking in the box below. Note that rectangles are not drawn to scale.
 - शक्षेत्र मा मान्द्र देव. ो
 - 2 -Rom maters

4. Adam Eulit algorithmic Tithes a penumeter of 12 meters. What are two possible ways it could be out?

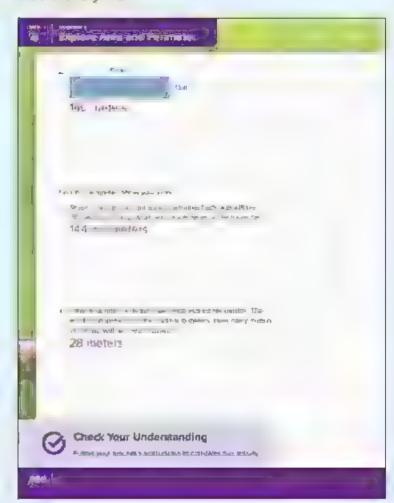
, arreste man in a reli de







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Materials List

 Large version of the Area Formula for Restangles anchor chart

Area Formula for Rectangles

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LESSON 2 Fill the Space

Lesson Overview

in this lesson istudents review how to find the area of a rectangle and then earn the formula. They call ate the area of shapes and apply that understanding to so vestory problems. As problems can be solved using a variety of multiplication strategies and will use numbers under 12 Students also rivestigate the relations up between area and per meter

Lesson Essential Questions

- How are area and perimeter is sted?
- How can I efficiently solve area and perimeter problems?

Learning Objectives

In this lesson

- Students will define area
- Students will use formulas to calculate the area of restian dies
- Students will explain how to calculate area.

Grade-Level Standards

4.D.1.d Apply the area and perimeter formulas for rectangles in real world and mathematical problems.



Vocabulary Check-in

area, length, two-dimensional, width

Lesson 2 - Fill the Space



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may confluse unit mames for area and perimeter by using this instead of square units.
- Students may confuse area and permater in both what the paest on it asking and by using an incorrect formula.

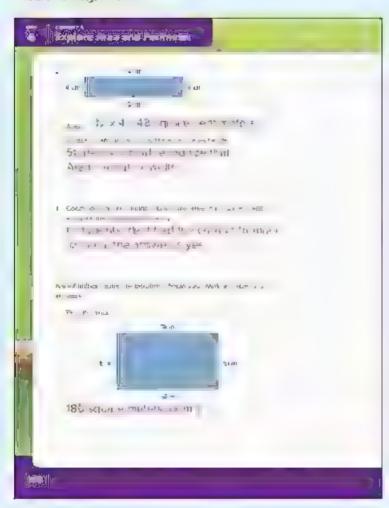
Number Talk

- Explain to students that they will use benchmark numbers to solve addition problems:
- 2 Begin Number la s
 - Write a problem on the board
 - Students think quetry and give a Thumbs-up when they know the answer
 - Give Wait Time so that all students have anough thrie to think about the problem
 - Callor several students who have the h Thumbs-Up and record thair answers on the board
 - · Ask students to experin their thinking
 - Record their thinking on the board so other students can see their strategies
- 3. Werk through the following problems
 - · 19+2: 19+5: 19+8: 19+12
 - 8 + 5: 9 + 13, 8 + 24, 18 + 7
 - 39 + 16; 28 + 39, 59 + 13, 23 + 49
 - 25 + 25, 25 + 26, 24 + 26, 26 + 49
- 4. With about 2 minutes telt in ACCESS, ask students to turn to Lesson 2 ACCESS Number Tall and respond to the question.

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Student Page 168



Eschipting the dim to the second red

to use a condition of are is any and a part of are

or from a second red to the are is any and a part of a condition of the are the area of the area

BUILD (40 min)



Area Review (25 mm)

- I Direct students to Lesson 2 Bu. D Area Review and ask students to chorally read the Learning Targets using a first-to-Prive, ask dudents to reflect first on what they remember about the definition of area, and second about how to find the area of a rectangle.
- 2. Use Calling Sticks to select students to share their thinking. Clear up any misconteptions and remind students that the area of a snape is the surface space of a two-dimensional snape, Help students generate ideas far examples of snapes they could find the area of, such as the top of a desk, the caserboth floor, a playground, or the cover of a book
- 3. Using the examples given by students, discuss the difference between area and permeter. For example, we would use area to measure the amount of floor space in the classroom, and we would use perimeter to find the distance around the classroom.
- 4. Direct students to Lesson 2 Bull D Area Review to detarmine the area of the rectangle in Problem 1
- 5 Give students a few minutes to try and soive the problem. Then ask them to raise their hands and share their strategy and solution.

「「「」」 E Signe structions, tra nition and down and a -- Eath Me was a 5 m b array Other tr 「 nies all the Boses us ja」

- b. Remind students that area is always measured in square units. It is called square units because we are filling in the rectangular space with squares that have two dimensions length and width it can be any unit of length—in imeters, cedimeters, meters of ometers—that we aways say squared or write an exponent of 2 to represent the amount of squares of a specific and that can be drawn in a grid of the shape
- 7 Ask students to solve Problems 2.4
- 8. After 5=7 m nutes, call on several students to share the formulas they wrote with the class.
- O Display the Area Formula for Rectangles anchor cham. Ask students to compare their formulas to the one on the anchor chart. Reinforce that the formula used to find the area of a rectangle is A = 1 × w.

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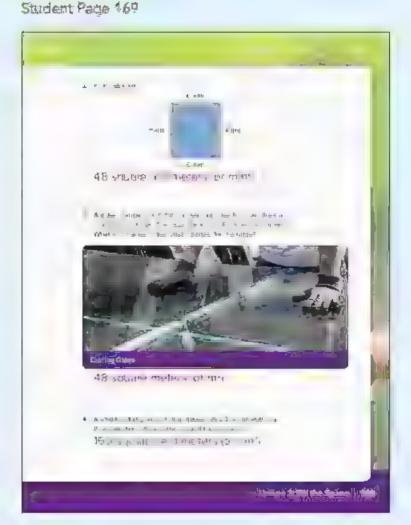
Answer Key for Area Review:

- 1 1, 2 , 40 , 4115
- 2 15% 医生产 資本 医骨性中央电影
- in Conservation is a second of the second of
- 4 it threats entrept without formula for area, the

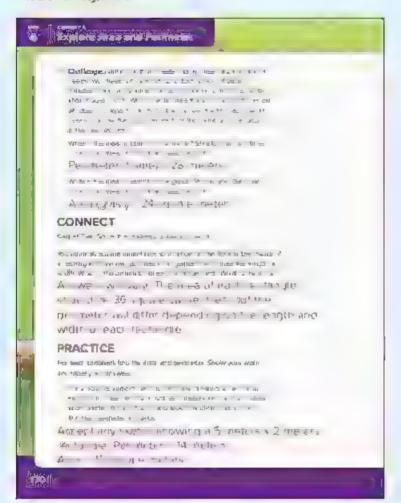
Area Practice (15 m n)

- Direct students to Lesson 2 Bull Di Area Practice Asil students to work independently to sowe the problems. Students who finish early should by the Challenge problem
- When there are 3 minutes left in Bull-D, go ever the answers with the class. Discuss any problems students might have struggled with or they felt proud to be able to solve. Ask students to share their problem-solving strategies.

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Student Page 170



Answer Key for Area Practice:

- i iti sowa e majer, mrm
- 📑 45 splane in meter i inn
- डे प्रदेश जाहता ह.साड अतारी
- e of mar entirete of mil
- Challenge: Per met in france 128 meters. Area jach in a loane meters.

CONNECT (7 min)



Carpet Tile

- Ask students to solve the problem in Lesson 2.
 CONIVECT Carpet file.
- 2 If time permits, ask students to share their solutions with the dats

WRAP-UP (3 min)





Let's Chat About Our Learning

- Direct students to talk to their Shoulder Partner to answer the essential question; from are area and perimeter related?
- 2 Use Calling Sturks to select students to share trie in thinking with the class
 - *CHERNOTE This can but as a function of a section of the differences between the teasons by a measure to a

Lesson 2 - Fill the Space



PRACTICE



Direct students to 'Lesson 2 PRACTICE and have their complete the problems. Address student errors and misconceptions

Check Your Understanding

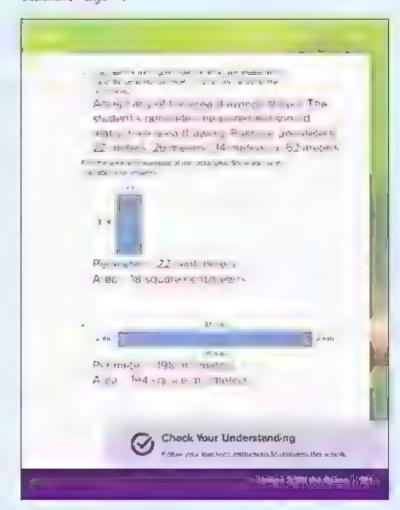
For each problem, find the area and parimeter Show year work and label your answers

- A = 49 square maters, P = 28 meters
- 2 年 -- Squitte cent stetle, s P- 30 er i metero
- 3. Solve the problem Show your work and abeliyour arswers

Omar's family is redecorating their during room fine room, is a rectangle that measures 4 meters one, and 3 meters wide thow many square meters of carpet will they need for the floor? How many meters of time will they need to trace the porder of the cell man?

के 1 इ.सामाण्या के मान्य १ के मानामा किल्ला

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Materials List

- Uiţilt 4 Lesson 3 9000T cards (1 card per pair of students)
- . Unit 4 Lesson 3 SCOOT answer key (Attine end of the volume!



Preparation

Photocopy the Blackine Master at the end of the Valuene.

DIGITAL



Something Is Missing!



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LESSON 3 Something Is Missing!

Lesson Overview

in this lesson, students apply area and perimeter formulas to solve for an unknown dimension in a rectangle or a square. The pimensions for the problems In this lesson go slightly higher than 10, so adjust the numbers as needed if students struggle with the multiplication

Lesson Essential Questions

- How are area and perimeter related?
- How can I efficiently solve area and perimeter problems?

Learning Objective

In this lesson

 Students will, use formulas to calculate-unknowns. when given some dimensions of rectangles

Grade-Level Standards

4.D.1.d Apply the area and permeter formulas for rectangles in real world and mathematical problems.



Vocabulary Check-In

area, din enslops, formula, per meter. unknown

Lesson 3 - Something is Missing!

ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may incorrectly use the area and perimeter formulas
- Students may overgenera se or under genera set the definition of area and/or perimeter situations.
 For example,
 - o Student interprets on "wall painting"
 problems as area, even if the problem take
 about the length of a striped border that is
 painted around the room
 - o Student interprets all "fence" problems as perimeter, even if the problem take about the size of the garden that the fence encloses.

Error Analysis

- 1. Direct students to besson 3 ACCESS Error Analysis
 Ask volunteers to read the directions and the
 problem a oud. Ask students to work independently
 to complete the error analysis.
- 2. After about 5 in nutes go over the answers to the enter analysis.
- If time allows, ask students to think of how they could reword the question so that the student could solve for the perimeter

Answer Key for Error Analysis:

is term or and note that the student hourse ff, we can find the period of the period o

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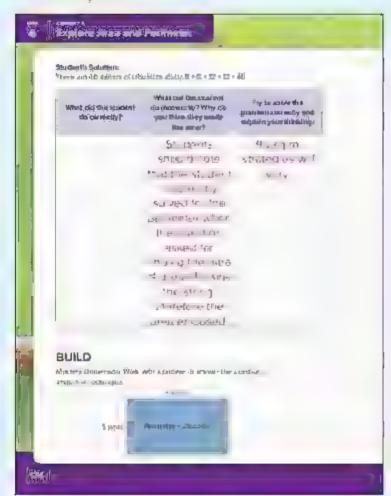
Student Pages 172-173







Student Page 174



BUILD (40 min)



Mystery Dimension (25 mm)

- Direct students to Lesson 3 BUILD Mystery
 Dimension Ask students to read the Learning larget
 silently as you read it aloud. Explain that today
 they are going to use their understanding of the
 area and perimeter formulas to solve for unknown
 dimensions
- 2. Ask students to examine the first rectange in their Student, Edition. Direct students to work with their Showlder Partner to complete Problems 1–3
- 3. After a few minutes, as students to explain their thinking using one of the permeter formulas
- 4. Ask for a vounteer to remind the class of the formula for area

 (Area = enoth x width)
- 5 Ask students to solve Problems 4-6 and raise their hand when they know the area of the rectangle
- 6. Ask students to think about how this problem is a ferent than the last one and give a Thumbs-Up when they are ready to share. Ask valuntaers to share their thinking with the class.

 Rambour thinking with the class.

 Rambour thinking with the class.

 I and that he have an war injurity a retear.

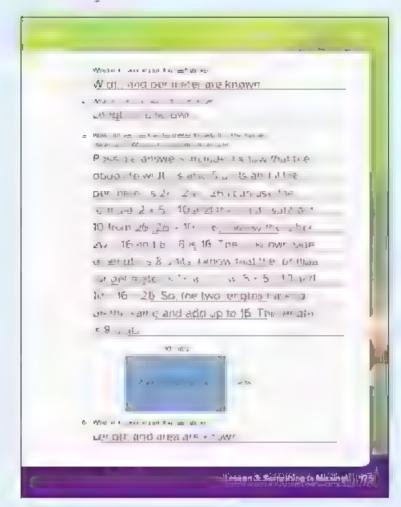
Lesson 3 - Something is Missing!

After a few minutes, ask volunteers to share their solutions and problem-solving strategies

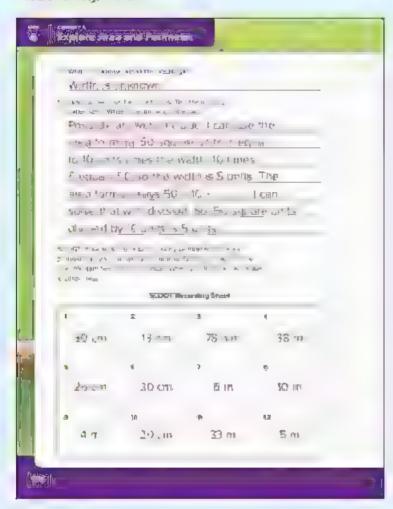
Answer Key for Mystery Dimension:

- 1 William and perkinator are anown
- 2 cervath is distinction
- Possible abovers makine a more that the apport to whith the do 5 white and 1000 per meter 12 + 10 more the forms a 2 × 5 + 10 and then car the interpolation as the 10 more 26 (2) 17 16), know the offerm that is the 10 more side of empty of the interpolation per meter that is the 10 and 10 + 16 = 26 Section law entries are the the same and add up to 10 for each of the 10 more than the 10 more than the 10 more and add up to 10 for each of the 10 more than the 10 more than the 10 more than the 10 more than 10
- + _ef t() # 310+310+ ATI
- E W at the Man
- Political terms of the large the area formula for the party of the width of the state width of the state of the large the large the large that the large the large that the

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Student Page 176



SCOOT (15 maa)



- 1 Explain to students that they we use the ast 88 10 minutes of BJ ... Dito save more missing dimension problems
- 2 Ask students to turn to lesson 3 BU LD SCOOT Introduce the SCOOT activity (depending on how you have set up the game):
 - Two vs cards, each labeled with a number and contaming a permitter of area problem. are placed around the room for distributed to partners).
 - Students were with their partner to solve the problems. They should show their work in the box that matches their card number
 - When flushed, pairs move to another card (or swap cards with another team)
 - The goal is to so we as many SCOOT cand. propierts as possible

TEACHER NOTE IS YOU'VE A WORKER SHOW THE - Pacification and a second and - • Terris play SCOOT well around the room to Beer Jeway M., 14 mts the mann steel ... If the a substance is broken as during the recommendation of students who cheet in the cards identify students who have in the

3. With a few in nutes left in Build, go over the answers with students (see the SCOOT answer key)

Answer Key for SCOOT:

equiport and prectice

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- orentmeters.
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- 11 3317--
- 1. I me ere

Lesson 3 - Something is Missing!



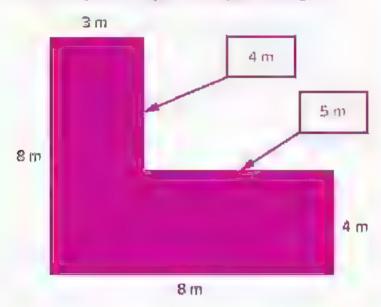
CONNECT (7 min)



Compound Shape Challenge

- Remind standards of the facts they learned about frequest at the perginning of the lesson. Ask a few students to share their favorite and fact.
- 2. Ask students to turn to lesson 3-COMNECT Compound Shape Challenge. Ask volunteers to read the directions and the problem aloud
- 3 After 5 minutes, use Calling Sticks to choose two or three students to stare now they so wed the propiers

Answer Key for Compound Shape Challenge:



Per meter = 32 meters -Ina = 44 square meters

WRAP-UP (3 min)



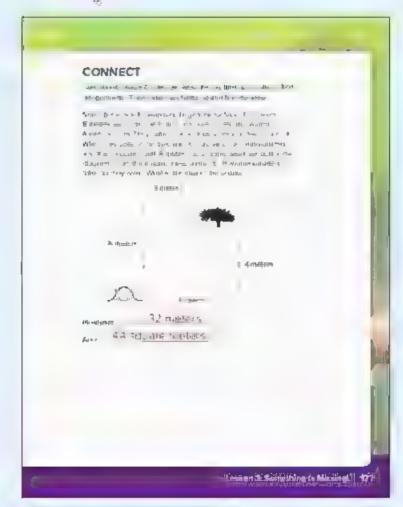
(P) Let's Chat About Our Learning

Ask students to discuss the following questions



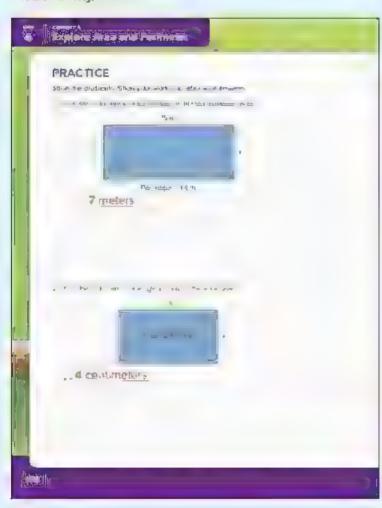
- What are some real-world applications for finding perimeter and area?
- When would you need to find area or the perimeter in your everyday life?

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Student Page 178



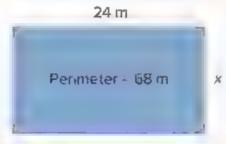
PRACTICE

Direct students to Lesson 3 PRACTICE and have them complete the problems. Address studentierrors and misconceptions

Check Your Understanding

Sowe the problems. Show your work and abe your answers

1 Find the unimove side length based on the given permeter



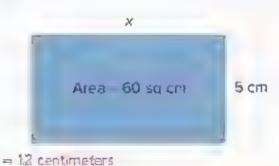
x = 10 mellers

 Pind the whynown side ength based on the given area



· t mete.

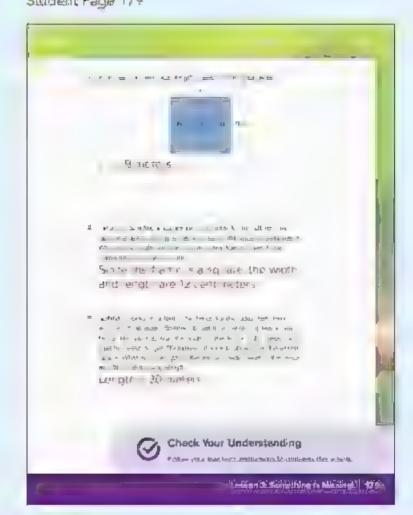
 Find the unknown side length based on the given area



- 4. Maken wants to build a new enclosure for his goats. The area of the new enclosure will be 84 square maters. He knows that one side of his enclosure will be 12 meters, and, but needs to figure out how wide it should be to complete the enclosure. Draw a sketch of the goat enclosure and determine the width numbeters.
- 5. Naked wants to put a hibbon border around a blanket she is making. The worth of the blanket is 3 maters. The per meter of the blanket is 16 meters flow long are the long sides of the blanket? Draw a siletch of the blanket and calculate the length of the long sides of the blanket.

 Length = 5 maters.

PRINT Student Page 179









Materials List

- Unit 4 Lesson 4 Shape Cards (1 card per student.
- Seissers
- Pape



Preparation

Phayocopy and out apart cards

DIGITAL





egi71t4088

LESSON 4 **Odd Shapes**

Lesson Overview

in this lesson istudents learn and apply strated as for calculating the area and per theter of complex shapes. Students use a variety of strategies to break shapes down into squares and rectangles to calculate their rr easy rements

Lesson Essential Questions

- How are area and perimeter related?
- How can I efficiently solve area and perimeter problems?

Learning Objectives

in this lesson

- Students will calculate the area and penmeter of complex shapes
- Students will explain their strategies for finding the area and perimeter of complex shapes

Grade-Level Standards

4.D.1 Solve problems avolving measurement and conversion of measurements

4.D.1.d Apply the area and perimeter form, las for rectangles in real world and mathematical problems



Vocabulary Check-In

area, complex, perimeter

Lesson 4 . Odd Shapes



ACCESS (10 min)



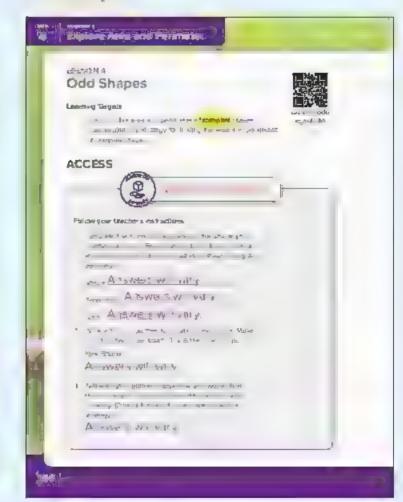
COMMON MISCONCEPTIONS AND ERRORS

- Students may strugglie to ibreak a more complex shape n'to squares or reclang as in order to calculate area and par mater
- Students may struggle to calculate missing side lengths in a complex shape (since not everything is labeled).
- Students may miscalculate perimeter if there is an
 overlapping side in a complex shape. They may
 add all sines to find perimeter but not recognize
 that some sizes are within the megular shape.

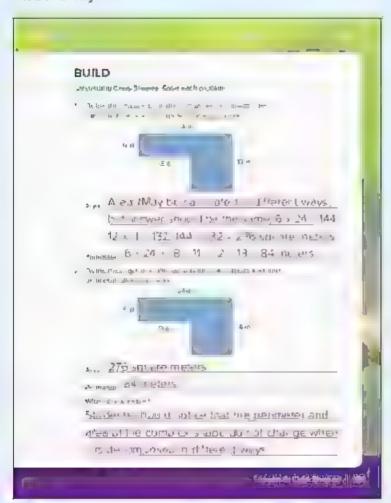
Making Crazy Shapes

- T Direct students to Lesson 4 ACCESS Waking Grazy Shapes and chorally read the Learning Targets
- 2 Ask students to prepict what is meant by the term complex shape
 - ो क्षित्रिक्ष क्षित्रिक्ष रहे का स्थाप कर्ता कर है के कर्
- 3 Give each student one lesson 4 Thape Cardland ask students to calculate the area and perimeter of the shape on their card. Direct students to draw their shape in their Student Edition and laber the dimensions
- 4 Distribute (or ask students to take out) scissors and have students carafully cut out their shapes a ong the perimeter.
- 5 Ask students to work with a partner to put their two shapes together to treate a unique shape
- 6. Each partner should trace their new shape in Lesson 4 ACCESS Making Crazy Shapes and then talk to their partner about what they think they would do to calculate the area and perimeter of the new shape (Students should not carculate yet)
- 7 Lse Calling Sticks to choose students to share their new shape and ideas for calculating the area and permeter

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Student Page 191



Answer Key for Making Crazy Shapes:

Shape T Parmy et at 20 (Art of et al 10 viole rent et al 10 viole rent et al 6 a continue et al 10 viole et ent et al 6 a continue et al 6 a conti

BUILD (40 min)



Calculating Crazy Shapes

 Draw the shape on the board and record its measurements



- 2 Ask students to talk to a partner about ways this shape could have been made from two other shapes.
- 3. Ask volunteers to share their deas. Draw rectangles on the board to help them. Listrate their thinking Statement of the several tag. In the several tag.
 - Cos in estation, of plantine assistants

 order, x La astrona, or or redants

 order, x

 foreign
 - The shift leading will be afforced in all members of a fighter entry of the control of the application of the control
 - The age emange mag. I meter x
 Emeter with a time emerge age to at mean means of the time ements.

Lesson 4 - Odd Shapes | 317

TEACHER NO E Some students may strugate

- 4. Direct students to Lesson 4 BUILD Carrieting Crazy Shapes. Ask students to work with their partners to complete Prothem 1. Remind students to think of the strategies they came up with during ACCESS and that they can decompose the complex shape into two rectangular shapes.
- 5 After a few immistes, go over the answer to Problem 1. Then, ask students to work with their partner to complete Problems 2–7. Students who finish early should try the Challenge problem.
- b When there are a few minutes left in BullD. Use an Attention-Getting Signal to regroup the class Ask students to share their solutions and now they overcame that enges. Ask students who solved the Challenge problem to share their answers.

Answer Key for Complex Shape Calculations:

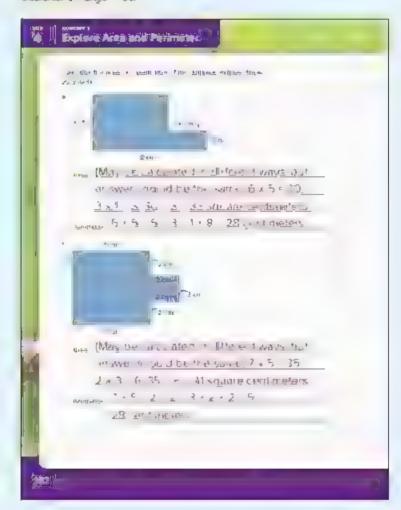
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3 What 1 , Ji st e

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fare is mides shape ebouted that get sheet to

Letter a sheet in it terent brays

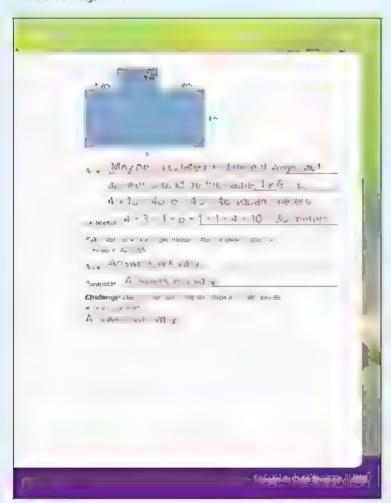
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Student Page 183



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- 6 HER (May THE BOWNSTERT OFFICE TWAS WELL OF A 10 HE CHARLES A 1 A 10 HER A 10 HER

AMENOUS WIN VAILY

- Challenge: Attewers will vary

CONNECT (7 min)



Writing About Math

Direct students to lesson 4 CONNECT Writing About Math. Ask students to talk with their Shoulder Partner about the queston, and then begin writing independently

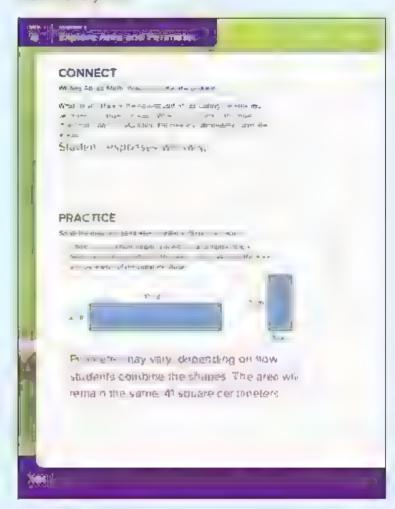
WRAP-UP (3 min)



Let's Chat About Our Learning

Ask students when they for an about in the r fam by might need to find the area or per meter of a complex shape outside of school Encourage students to aseach other guestions

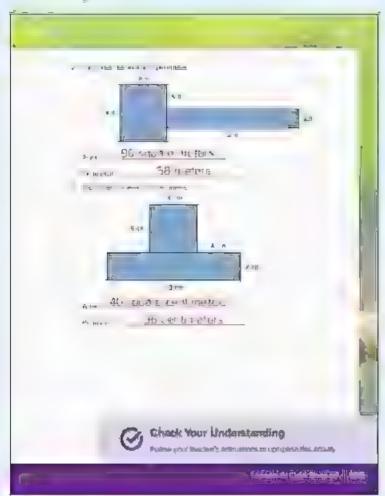
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Student Page 185



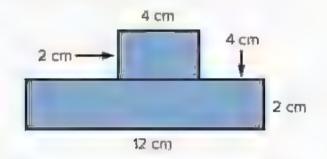
PRACTICE

Direct students to Lesson 4 PRACTICE and have them complete the problems. Address studentierrors and miscenceptions

Check Your Understanding

Sowe the area and perlimeter problems. Show your work

When Reem calculated the permeter and area of this snape, she found that the permeter was 36 continueters and the area was 32 square centimeters. Only one of those measurements is accurate



- 1 Which of Ream's measurement is accurate? Show how you liftow.
 - Affect in accurate decamber 4 x 2 + 12 x 2 = 32 square centuriaters
- 2 What is the correct answer for Reem's incorrect measurement? Show how you know.

 If either ethics, in he size or threaters secal service 4 + 4 + 2 + 4 + 2 + 4 + 2 + 4 = 32 centimeters.
- 3. Why do you think Reem made that error?

 Students may indicate that she added an extra 4 in from the pottom of the top rectangle even though that is joined to the larger rectangle. Rees in a may be a second to the larger rectangle. Rees in a may be a second to the larger rectangle.

LESSON 5 **Growing Dimensions**

Lesson Overview

in this essen, students apply area and perimeter. formulas to solve multisted multiplicative comparison Stary problems. A multiplicative comparison is a statement demonstrating the relationship between two flumbers. Students consistently use phrases such as, "In times as long as..." to make these compar sons Students use a variety of strategies to acive these problems

Lesson Essential Question

 How can l'effic entry so ve area and perimeter problems*

Learning Objective

in this lesson

 Students will use area and perimeter formulas to some multiplicative comparison problems

Grade-Level Standards

4.D.1 Solve problems involving measurement and conversion of measurements

4.D.1.d Apply the area and pendletenformings for rectangles in real world and mateganistical propiers



Vocabulary Check-In

array, multiplicative companison, square units



Materials List

- Cutsk 10 alm × 10 am squares but af. colored construction paper (1 set for the
- Tape

DIGITAL



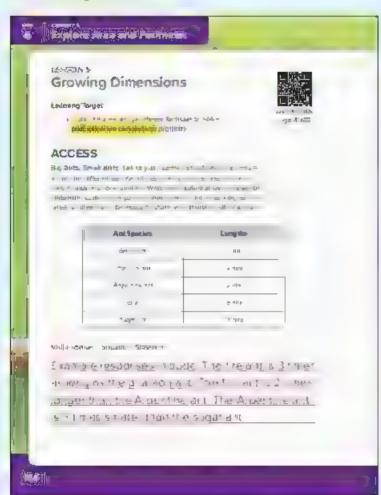
Growing Dimensions



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Student Page 186



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may not realize that multiplicative
 paraparisons focus or compating two quantities
 by showing that one quantity is a specified
 number of times larger or smaller than the other
- Students may think that all shapes with a given perimeter have the same area or that all shapes with a given area have the same perimeter.

Big Ants, Small Ants

- 1 Except students to Lesson 5 ACCESS Big Ants, Small Arits inform students that today they will focus on comparing measurements using the phrase "nitimes as long as . " where nitepresents a flumber. For example, the pharaon and is two times as long as the gnost and.
- 2. Ask students to share their observations with a partner and write one multiplicative comparison statement using a comparison phrase like "in times as long as" or "in times smaller than "
- 3 After a few minutes, use Caling Sticks to choose two or three students to share their responses

Answer Key for Big Ants, Small Ants:

E ampreteduction to

- The free are \$ 31 tellas (1 ara. 1 e. 1)
- Trette at a mer or pert at see expentre of
- The engelope and elimental eliming

Lesson 5 - Growing Dimensions



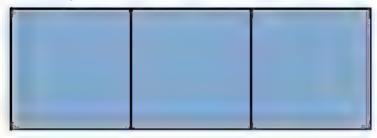
4 Explore Area and Perimeter

BUILD (40 min)



Draw and Solve (20 mm)

- 1. Explainto students that today they will use multiplicative comparisons using the phrase "n times as long as" where n represents a number to solve area and permeter problems
- Direct students to the beginning of Lesson 5 to sherify read the Learning Target
- 8. Moderašing square ties to compare sizes. Call on some students to help you.
 - Let's create a rectangle that has a width of 1
 unit and a length 3 times as long .(Tape three
 squares on the board, side by side)





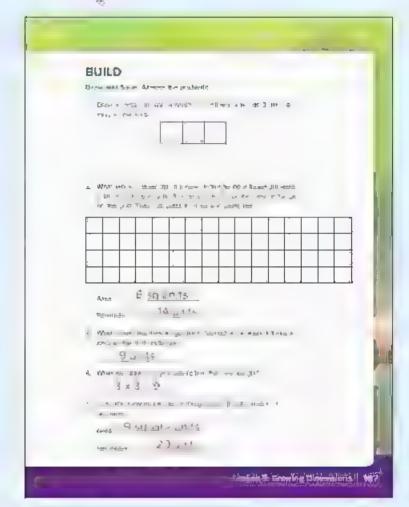
- What is the moth and length of this rectangle?

 (which = 1 unit length = 3 units)
- What is the area of this rectangle?
- What is the penmeter of this rectangle.
 8 and to

Record responses on the board as students answer

- 4. Ask staylends to turn to sesson 5 Build Draw and Soive and graw the rectangle on the grid paper
- 5 Te I students you want to create a new rectangle with a length 2 times as long as the onig na. rectangle. Ask students how many squares you should add (3) Add 3 squares to your rectangle on the board and ask students to draw the new rectangle in their Student Edition and to find the area and perimeter. Ask students questions and give them time to discuss.

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- What is the width and length of this new rectangle?
 (width = 1 shift length = e troits)
- What is the area of this tectangle?
- What is the perimeter of this rectangle (14 units)
- Is there a relationship between the measurements of the first ractangle and the new ractangle?

 The area of the second arrangle situation are as a general to the transport of the second arrangle.

Record responses on the board as students answer

- Ask students to complete Problems 3-6 in their Student Edition
- 7 Use Calling Sticks to call on two or three students to share their responses

Answer Key for Draw and Solve:

He Comments

Permiteter = 14 units

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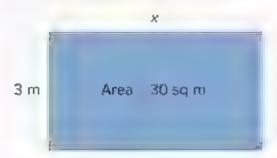
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4 Explore Area and Perimeter

Picnic at the Park (20 m n)

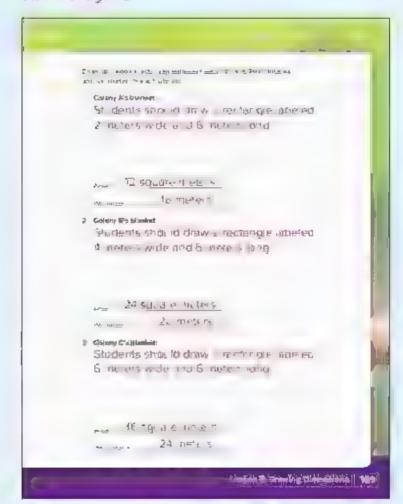
1 Draw the following on the beam and ask students now they can find the missing side



- 2 Fel students the rectangle represents a playground the border of the rectangle is the fence around the playground. Telestudents the school wants to put in a jungle gym that has the same width as the playground, but is a stong as the playground. As
 - What is the ength of the jungle gym? 5 meters
 - What is the area of the jungle gym?
 15 square meters
 - How much room will be left on the playground?
 15 square meter:
- Asi students to share their thinking with their Shoulder Partner Than, asia volunteers to share their strategies and solutions. Ask questions to prompt students "thinking; such as
 - What do we heer to do to answerthese questions? (Find the lange parameter calculate the area.)
 - What do we do once we know the area of the jungle gym? How do we find out how much morn is left? (Subtract the area of the jungle gym from the area of the playground.)

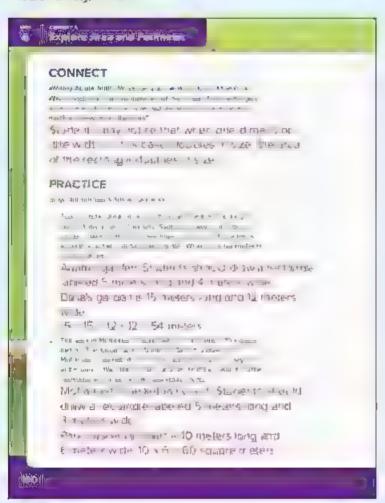
- 4 Explain that there are many strategies students can use to solve this problem
- Ask students to term to Lesson 5 Build Ponce at the Park and work with a partner to complete Propiers 1–3

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6. At the end of Buil, D; use an Attention-Getting Signal to bring the group back together. Discuss the ways students tried to solve the problems, the diagrams they created for each problem, and the relationships between the perimeters in the problem. Questions to ask may include.



- How did you use your knowledge of area and penmeter to solve the problems?
- What conclusion can you make about the areas of the rectangles?

Answer Key for Picnic at the Park:

া নি না y কি মানি দিশ হোগনে বা কাজন ভি ভালি মূল কুল ভালি ৷ সাহাত থেজা জুহু কলোক সালালালাল সালালা নাইল ি এক সভালিকে Permeter — 15 সভালি

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CONNECT (7 min)



Writing About Math

Ask students to turn to besson 5 CONNECT Writing About Math and respond to the prompt.

Answer Key for Writing About Math:

Laszon 5 - Growing Dimensions



WRAP-UP (3 min)





Let's Chat About Our Learning

- 1 Ask, students to talk to their Shoulder Partiter about their Writing About Math response
- 2 Use Calling Sticks to have two or tringe students share their deas with their assi

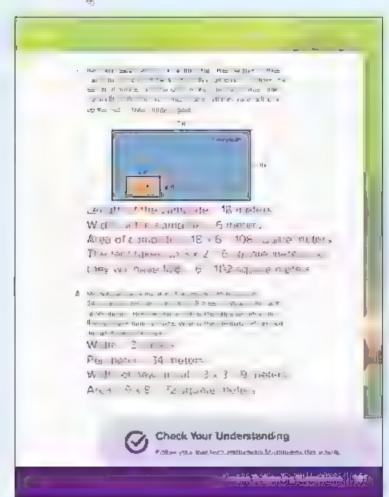
PRACTICE

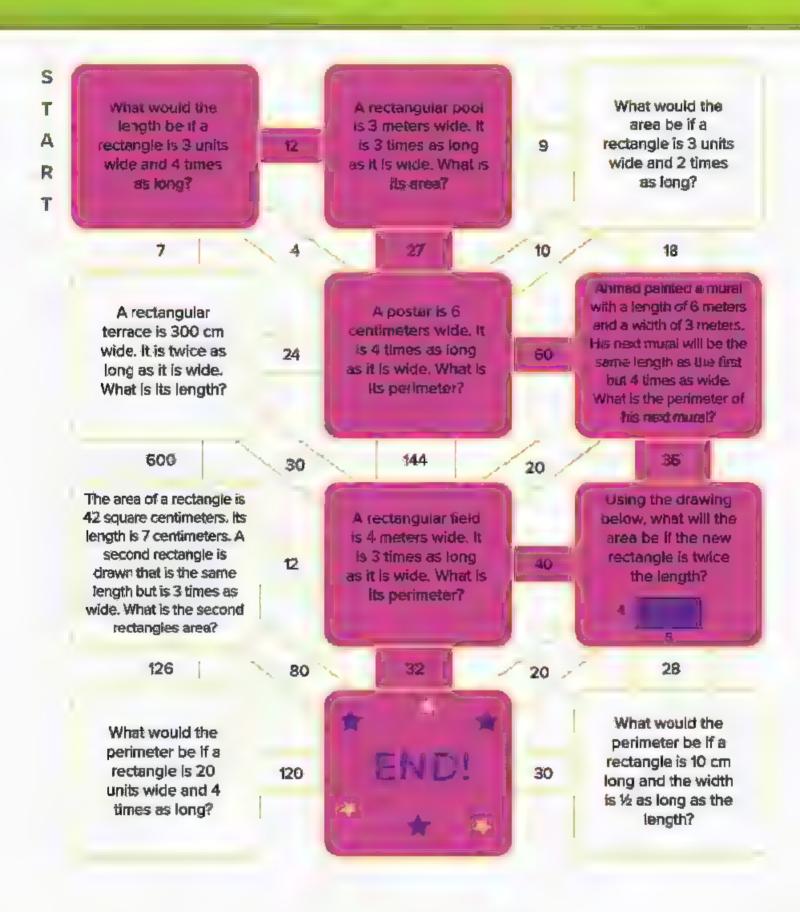
Direct students to Lesson 5 PRACTICE and have them completé the problemit. Address student errors and Introprophens

Check Your Understanding

Work your way through the maze Begin at Start

PRINT





Concept Check-In and Remediation

Lesson Overview

mithis essan, students work to correct misconcept and and eners from Concept 1 Explore Area and Perimeter First, administer the Concept Check-In. Once you have reviewed the spiz results, thoose remediation activities based on the needs of your students. Some recommendations are isted in the chart, but the needs of your particular students should inform your choices Students may work independently. In pairs, or in a small group with the teacher

Lesson Essential Questions

- "Detallar fetaminad bins sais are work."
- "How can "Effic anily so, we area and parigneter problems?

Learning Objective

in this lesson

 Students will work to correct misconceptions and term is related to area and perimeter.

Grade-Level Standards

4.D.1.d Apply the area and perimeter formulas for rectangles in real world and mathematical problems



Vocabulary Check-in

Review concept vocabulary as needed



Materials List

Materials with vary

DIGITAL



Concept Check-In and Remediation



Ou cit Code egimt4898

Company of the second second

- Studients may confuse area and per meter.
- Students may overgeness ite or under generalize the definition of area and/or per meter situations
- Students may not realize that multiplicative comparisons focus on comparing two
 quantities by showing that one quantity is a specified number of times arget or smaller
 took the other.
- Students may to not that a shapes with a given permeter have the same are a or that all shapes with a given area have the same per meter.

Concept Check-In and Remediation

Remediation: Correcting Misconceptions

IF...

Students confuse perimeter or area

Then . . .

Review Lessons 1 and 2

Consider having students build smaller rectangles with square dubes or draw rectangles on graph paper, counting the number of square units and also counting the perimeter units

Clapfy names of units, shouring that students understand that perimeter is a measurement of unit lengths and area is a measurement of square units

Provide hands-on practice-building and drawing to some perimeter and area problems. This can be p students build concrete understanding that can after be transferred to abstract formly as

If . . .

Students over or under generalize area and perimeter in story primeres

Then...

Work with small groups to review story problems from throughout the unit. Provide a variety of examples of story problems and ask students to sort, them into parimeter of area phoblems. Support students as they solve the problems.

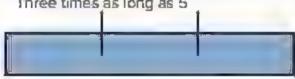
Students do not realize that multip icative compansors focus on comparing two quantities by showing that one quantity is a specified in imber of times argenor smaler that the other

Then.

Review Lesson #. Consider engaging students to more practice where they are given one number and determine 2 times as Inven or 3 times as much Students can use graph paper of bar modes to draw the init a amount and the new amount to concretely see the multiplicative comparison. Examples



Three times as long as 5



I#...

Students think that all shapes with a giver perimeter have the same area or that all shapes with a given area have the same perimeter

Then

Review the CONNECT sections of Lessons 1 and 2. Consider having students build or draw a variety of rectangles with the same areas and see how that affects the perimeters and vice versa-

Concept Check in and Remediation







Multiplication as a Relationship

Unit Storyline



Unit 5 Multiplication as a Relationship Storyline

The Multiplication as a Relationship unit extends students' working knowledge of comparing quantities taking addition and subtraction (additive comparison). Students apply these understandings to comparing quantities using multiplication (multiplicative comparison). Strategies introduced in this unit will be used in future grades related to preportional relationships. To support earning, students observe video footage and investigate problems related to different modes of transportation to enhance their understanding of comparing quantities using multiplication.

Unit Standards

4.A.2.b	Multiply a whole number of up to four digits by a one-digit whole number using strategles based on place value and the properties of operations
4.C.1.a	man reduction education as a comparation as the state of
4,C.1.b	Representive(ba) statements di multipi cative comparisons as multipilication equations
4.C.1.e	Multiply or divide to solve word problems involving multiplicative comparison, (for example, using drawings and equations with a symbol for the unknown number to represent the problem)

Unit 5 Structure and Pacing

If Mathematics instruction is based on 60 minutes/5 days a week, deliver the lessons as written in the Teacher Edition.

Concept 1: Multiplicative Comparisons

Understanding Multiplicative Comparison

Learning Objectives

- Students will define multiplicative compansor.
- Students will model multiplicative comparison problems

Lesson 1

Lesson 2

Student Learning Targets

- troan define multiplicative comparison
- can explain how multiplication can be used to compare numbers
- can preate misde site show mis tip, cative compartisons

Creating Multiplicative Comparison Equations

Learning Objectives

- Students will create equations to represent multiplicative comparison problems
- . Students will use jetters to represent unimown du arrupes in equations

Student Learning Targets

- can create multiplication equations to represent comparisons.
- rearruse at effect to represent aimissing number in a multiplication problem.

Solving Multiplicative Comparison Equations

Learning Objective

Lesson 3

Students will create and solve multiplicative comparison equations

Student Learning Target

I can solve a multiplication equation that represents a comparison

Unit 5 Multiplication as a Relationship

Unit Structure and Pacing cont'd

Concept Check-In and Remediation

Learning Objective

 Ştudentş will work to correct misconceptions and errors its ated to multiplicative compansons

Student Learning Target

Lean correct my miscon septions and errors related to multiplicative compansons.

Concept 2: Properties and Patterns of Multiplication

Commutative Property of Multiplication

Learning Objectives

- Students explain the Commutative Property of Multiplication
- Students will apply the Commutative Brogerty of Multiplication to solve problems

Lesson 4

Student Learning Targets

- I can explain the Committative Property of Multipocation.
- I can apply the Commutative Property of Multiplication to solve problems with and without an unknown number

Patterns of Multiplying by 10s

Learning Objectives

- Students will apply the identity Property of Multiplication to solve problems.
- Students will apply the Zero Property of Multiplication to solve problems
- Students will identify patterns that occur when multiplying by 10, 100, and 1,000.

Lesson 5

Student Learning Targets

- I can explain the dentity Property and Zero Property of Multiplication.
- can apply the identity and Zero Properties of Multiplication to solve problems
- I can logniffy patterns, observe when multiplying by 10, 100, and 1,000

Review Exploring Patterns in Multiplication

Learning Objectives

Lesson 6

Lesson 7

Lesson B

- Students will apply place value concepts to multiply by multiples of 10, 100, and 1,000
- Students will explain patterns when multiplying by multiples of 10, 100, and 1,000

Student Learning Targets

- I can use place value to multiply by multiples of 10, 100, and 1,000
- figar explain patterns when multiplying by multiples of 10, 100, and 1,000

Exploring More Patterns in Multiplication

Learning Objectives

- Students will exprain the Associative Property of Multiplication
- Still dents will apply the Associative Property of Multiplication to solve problems

Student Learning Targets

- I can explain the Associative Property of Multiplication
- Lean apply the Associative Property of Multiplication to solve problems

Applying Patterns in Multiplication

Learning Objective

 Students will apply decomposing and the Associative Property of Multiplication to solve equations with impliples of 10, 100, or 1,000

Student Learning Target

 I'van apply-decomposing and the Associative Property of Multiplication to solve equations with multiples of 10, 100, or 1 000.

Concept Check-in and Remediation

Learning Objective

 Students will work to correct misconceptions and empire related to properties and patterns of multiprication

Student Learning Target

 can correct my misconceptions and errors to sted to properties and patterns of routip cation.

Unit 5 Multiplication as a Relationship

Multiplication as a Relationship

Alternate Pacing Guides

If Mathematics instruction is based on 45 minutes/5 days a week, do the following:

Reduce ACCESS by 3 minutes

Redlings Bu . D by 8 minutes

Reduce CONNECT by 2 minutes

Reduce WRAP-CP by 2 minutes

Strategies for reducing time in each section:

- · Priscuss fermer examplies
- Æ minate Shoulder Partner conversations
- Shartenic assidiscussions
- Work with students to complete ACCESS problems

If Mathematics instruction is based on a combination of 45 minutes/4 days a week and 90 minutes 1 day a week, do the following:

Follow the 45-mmute approach for the #5-mmute days

Teach two 45-m nuite ressons on the 90-minute day

If Mathematics instruction is based on 90 minutes/5 days a week, do the following:

increase ACCESS by 5 minutes

Increase Build by 20 minutes

ncrease CONNECT by 3 minutes

ncrease WRAP-UP by 2 minutes

Strategies for increasing time in each section:

- Discuss additional examples as needed
- Enternal class discussions
- Allow time for hands on work with manipulatives and models
- Provide additional practice problems for students who need additional practice
- Encourage students to share and model their problem-solving strategies.

Mathematical Background Knowledge

Multiplicative Comparison

In Primary 3, students developed their understanding of multiplication and division wang equal droups in Primary 4, students ould on that inow edge by exploring how multiplication and division can be used to compare gladiffees. Students are a ready familiar with comparing quantities using a dation and subtraction (additive comparison). Now students learn that multiplication tail also be used to compare numbers (if a to licative comparison). Students use tape diagrams to represent these relationships between numbers. This strategy is important in building an understanding of proportional selectionships in future grades.

In Primary 3 students mode ed and so ved multiplication and division problems in Primary 4, students learn how to write equations using a letter to represent an unknown value. If it is important to note that when creating these equations, the unknown number can be in different positions in the equation $(4 \times a = 16 \text{ or } 5 = 4 \times 4)$.

in Primary 3 students used various strategies such as drawings and arrays to solve multiplication and division and division and division are thresholders. Students learned that the addition and subtraction, multiplication and division are thresholders operations and that the numbers the struct of cation of division equation form a fact tarmly in Primary 4 students further threse understandings as they solve for an unit own in a multiplication equation. Students may continue to utilize modes to solve multiplication solutions but should be moving towards mastery of multiplication facts from memory.

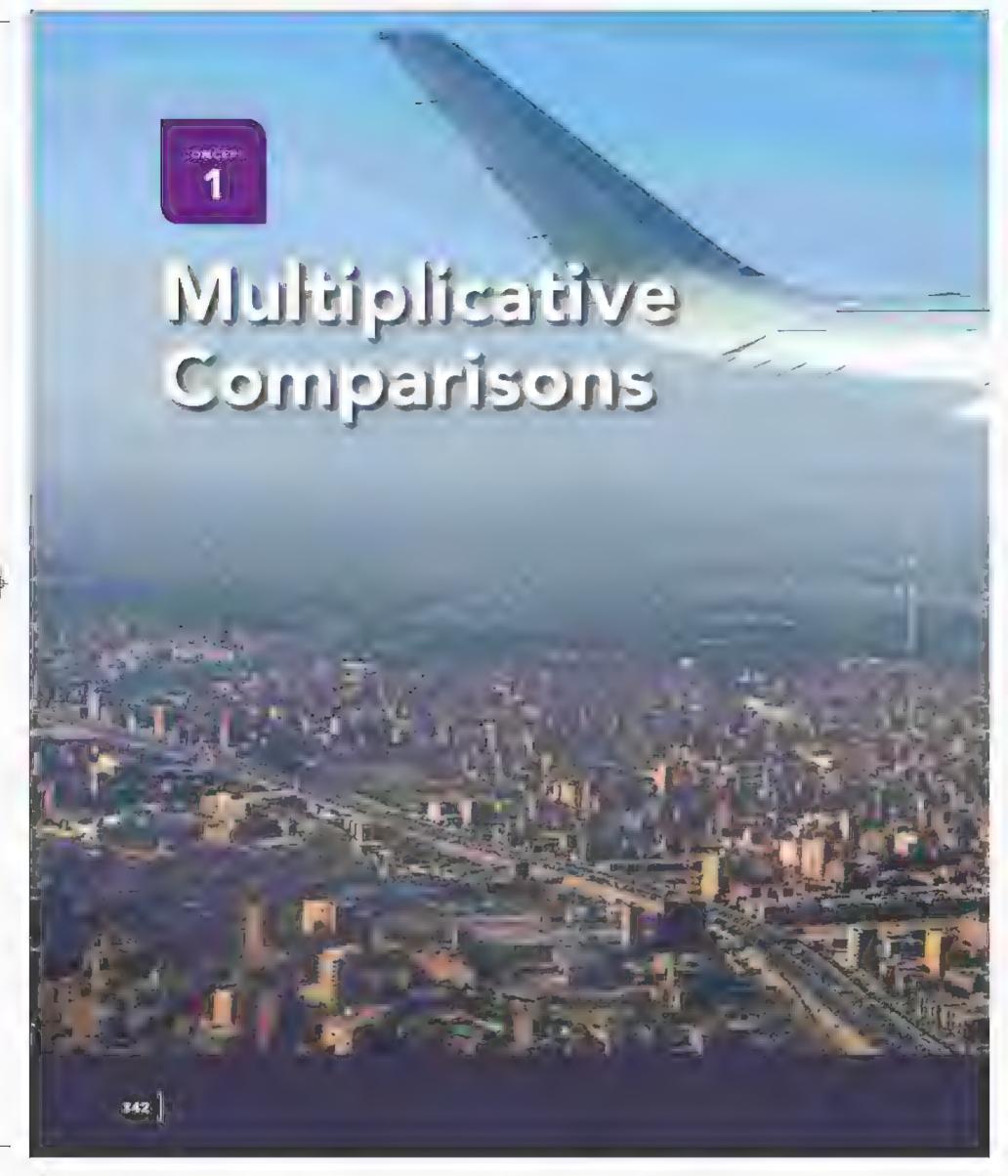
Properties of Multiplication

In Primary 3 students were introduced to several properties when building their understanding of multiplication in Primary 4 students review the rules for multiplying by 0 and 1 and name these rules. The Zerp Property of Multiplication states that any factor multiplied by 30°, equals zero and the dentity Property of Multiplication states that any factor multiplied by 10°, 100°, and 1°,000°. They explain the patients that they notice and relate them to the place of the digit with the highest value and the number of zeroes in the factor. Students in Primary 4 dentify patients when multiplying by multiplies of 10°, 100°, and 1°,000° in order to strangthen their understanding of place value in multiplication and to prepare them for learning strange es for multiply, multiplication

Pamary 4 students also review the Commutative and Associative Properties of Multiplication and apply them in new and challenging ways. They are introduced to the use of parentheses in mathematics an important drouping symbol that will be used again when students learn to evaluate expressions in Primary 5. Students thin about strategically pain in factors in order to solve complex multiplication problems more efficiently. Being able to think fexibly about plumbers and understanding a variety of strategical will help students to better understanding multiplication.

Unit 5 Multiplication as a Relationship



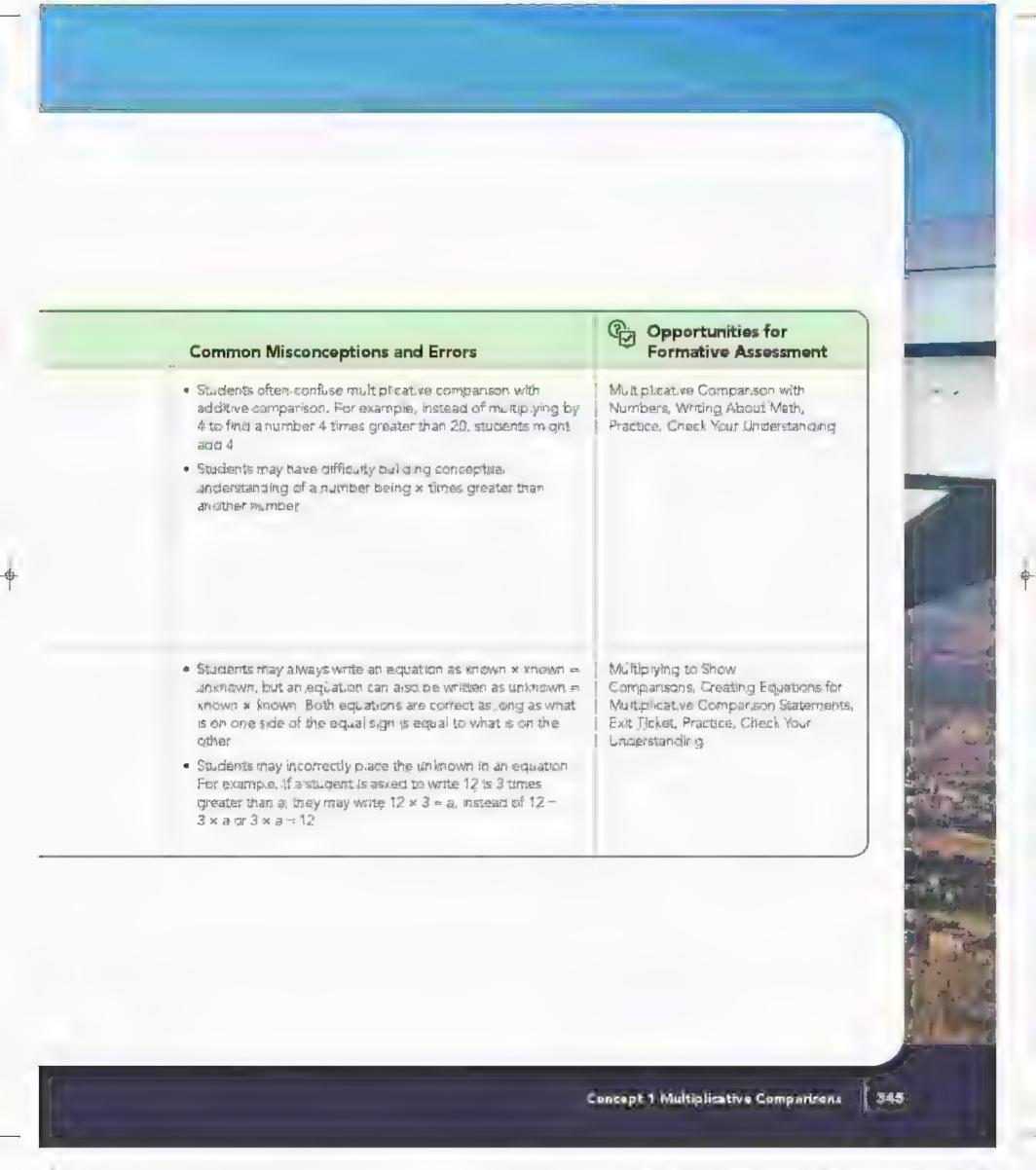




Concept Planner

All lessons are designed to be 60 minutes. The materials fixted in this chart are items to gather for each group. Items for the class or for individual students are indicated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
Muterstanding Muterstanding Muterstanding Comparison	 Sessors (1 per student). Give or give sick (1 per student). Tape Photocopy the following Brackline Masters found at the end of this velume. Teacher Paper Strip 96 cm (1 for the teacher). Strips of paper 3 gimining (1 per student). Student Tapes (1 copy per student). 	Estimate Multiplicative comparison Tape diagram	Students will define multiplicative comparison multiplicative comparison problems
Z Creating Multip leative Comparison Equations	No add Llona i materials needed	Equation Factor Multiplicative comparison Product	Students will create equations to represent mustiplicative companisor problems Students will, use retiers to represent unknown quantities in equations



-	.rvc	
-	125	
	4	

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
3 Solving M. tplicative Compensor Equations	No additional materials nacided	Inverse	Students will theate and solve mutiplicative comparison equations
Concept Check-in and Remodiation	Materials w vary	Review concept vocabulary as needed.	Students will work to correct miscon captions and errors to ated to multiplicative compansors

Opportunities for Assessment:

n-addition to the assessment opportunities included withis chart, each concept will include a Concept Check-In

- Opportunities for Formative Assessment
- Students may have teaching their own comparison season on a sugar on using the information provided.
- Students may not recognize that multiplication and division facts can inform the relationships they are exploring

How Many Seats?, More Seats to Sail, Practice, Check Your Understanding

- Students may have difficulty building conceptual understanding of a number being witnessgreater than another number
- Students may always write an equation as known × known =
 unknown, but an equation can also be written as unknown =
 known. Buth equations are correct as long as what
 is on one lide of the equal sign is equal to what is on the
 other.
- Students may incomed y place the atknown in an equation.
 For example, if a student is asked to write 12 is 3 times.
 greater than a, they may write 12 x 3 = a instead of.
 12 | 3 x a
- Students may have trouble creating their ewin comparison statement and equation using the information provided

Concept 1 Multiplicative Comparisons

LESSON 1 Understanding Multiplicative Comparison

Lesson Overview

in this lesson students investigate now multiplication can be used to compare quantities. Students are intipoduced to tape diagrams as another strategy for visualizing multiplication and relationships between numbers.

Lesson Essential Question

 How can rhultip reation be used to compare numbers?

Learning Objectives

In this lesson

- Students will define mult plicative compensor.
- Students will model multipricative compension problems

Grade-Level Standards

4.C.1.a Interpret a multiplication aquation as a comparison.

4.C.1.b Represent Verbal statements of multipricative companions as implied leation equations



Vocabulary Check-in

estimate, multiplicative comparison, tabe diagram



Materials List

- Sciesons (1) per student)
- Give or glue stick () per stirtent)
- Tape



Preparation

Photocopy the following Blackline Wasters (at the and of this volume).

- Reacher Paper Strip 90 cm long (1 for the teacher)
- Sir ps of paper 3 cmi rong (1 per student)
- Student Tapes // copy per student/

DIGITAL



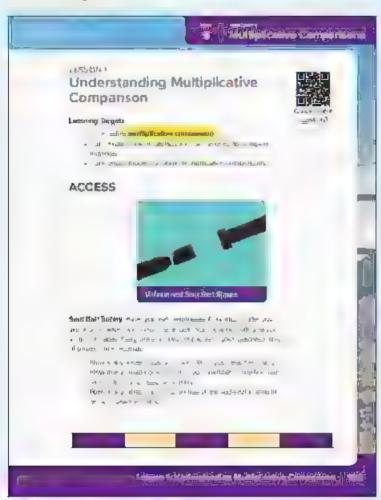
Lesson 1

Understanding Multiplicative Comparison



OL or Cade egmt4063

Student Page 195



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students often confuse multip reative comparison
 with additive companison. For example, instead of
 multiplying by 4 to find anomiber 4 times greater
 than 20, students might and 4.
- Students may have difficulty by ding conceptual understanding of a number being within greater than another number.

Seat Belt Safety

- 1 Tape the 90-em strip of paper onto the board or wall, where a listudents can see it liabs it 90 cm. Distribute one 3-cm strip of paper to each student. Ask students to write 3 cm on their strips.
- 2 Te students that their strips represent how safe it is to note in a par without a seatcelt. Show students the 90-cm strip and terminal that it represents how safe it is to ride in a car with a seatcelt.
- 3 Ask sturients to turn to Lesson-1 ACCESS Seat Belt Safety Ask students to mentally compare the strips and think about what they flustrate about safety riging in a car with and without a seatbelt
- Ask students to estimate, how many officer strips they think, it would take to equal the feather's strip (If necessary, remind students that estimating does not require an exact answer)
- Ask students to work with a partner to put their strips together end to end and refine trie.r estimates. If possible, have students work in small groups to put their strips together end-to-end to further refine their estimates.
- Pecond estimates on the board and to students they will come back to this deal at the end of the lesson (Make sure students keep their 3-cm strips out.)

Lesson 1 - Understanding Multiplicative Comparison





Multiplicative Comparisons

BUILD (40 min)



Visualizing Multiplicative Comparison with Diagrams (15 m_in)

- 1. Pel students that so far they have used place value to compare numbers, but roday they will compare numbers us no multiplication. Explain that they have already gotten a little practice doing that by comparing their strip to your strip and est mating "now many times" their small strip could fit onto the arger strip.
- 2 Teu students they will be using tape diagrams to earn how to compare using multiplication. Explain that a tape plagram is a visual mode, that helps us understand number relationships.
- 3 Show students how the create a tape quagram. Draw two rectangles on the board, each representing 5 Religious that this diagram shows 5 two times

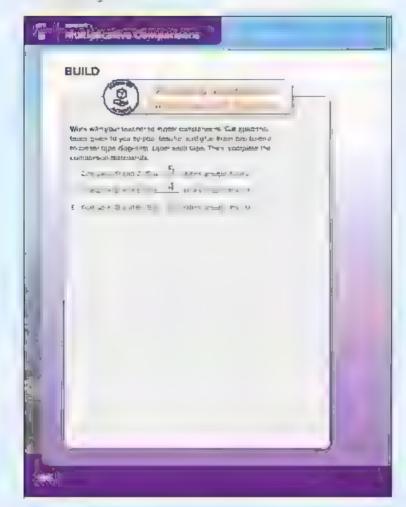
5 5

4 Ask students to provide the answer to "how much is two 5s?" Write 10 letwo times greater than 5 under the tape diagram and explain that the tape diagram life as us see that 10 is two times greater than 5

if ACIMED NOTE INdie sure students undersword
that the "tapes" in the repe disquarmepresent
equal gloups When our structing a tape disquarm
expension our structure our structure
expension our structure our structure our structure
expension our structure our

5 Direct students to Lesson 1 B...LD Visualizing Multiplicative Comparisons with Diagrams
Distribute a set of Student Tapes to each student

PRINT



Answer Key for Visualizing Multiplicative Comparison with Diagrams:

Multiplicative Comparison with Numbers (25 man

- 1 Explain that tape diagrams can be he pfull in outland understanding of multiplicative comparison, but students have another tool they can use multiplication facts. As students to think about multiplication facts and now they might use multiplication to compare 24 and 4. If students are struggling, ask, "How many times greater than 4 s 24?
- 2 After about 30 seconds, have students share their thinking with their Shoulder Partner if necessary, ask students to help you greate a tape diagram. Draw "tapes" on the topical to represent the quantity 4. Ask students to help you determine now many tapes you need to draw to eque 24. Ask questions as needed to help students a derstain that 6 tapes are needed, so 24 is 6 times greater than 24. Write "24 is 6 times greater than 4" on the board.
- 3 Ask students to share any other stratedies they thought of or used for using the tip, cation relationships to compare 4 and 24
 - The students thay draw 24 to yourse and dwide them minigroups of 4. The transfer is the groups of 4. The transfer is a correct at sweet.
- 4. Explain to students that because We know the multiplication fact 6 x 4 = 24. We can say that 24 is 6 times greater than 4. Tall students that they just completed a multiplicative companison of 24 and 4.
- 5. Direct students' attention to Lesson 1 BL LD Multiplicative Comparison with Numbers Ask students to work with a partner to complete the problems. Students may draw tape diagrams or use multiplication facts to complete the comparisons but must be able to explain their strategies.
- 6. After about 15 minutes, go over the answers with students. Clarify any inteconceptions of students are struggling, ask volunteers to mode their work at the board.

Answer Key for Multiplicative Comparison with Numbers:

1 5

2 4

1)

Lesson 1 - Understanding Multiplicative Companison

CONNECT (5 min)



Writing About Math

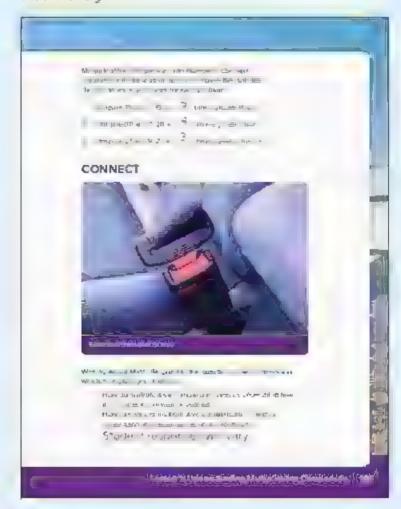
- Ask students to jum to Lesson 1 CONNECT Writing About Mathrand respond to the prompt.
- 2. If time allows, ask students to share their ideas with the class.

WRAP-UP (5 min)

Seatbelt Safety Follow-up

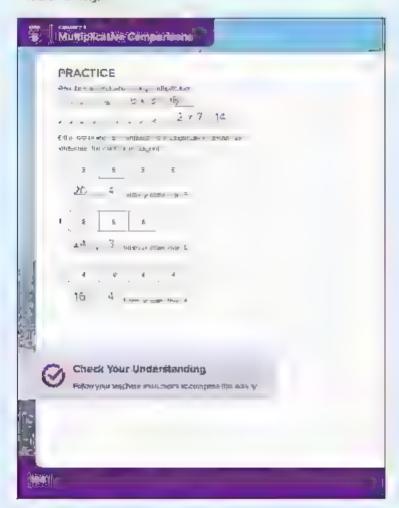
- 1. Remind students of the ACCESS section of the lesson and that your strip of paper is 90 cm long and their stripsage 3 cm long.
- Ask volunteers to come up and tape their strips under your strip. (If there are fewer than 30 students in the class, give students extra strips to the board.) He sure students are taping the strips directly be ow yours and connecting them end-to-end
- 3. When finished, have students count, aloud with you as you south the stups. Confirm that your strip is 30 times greater than their strip. Explain that the tape of agram shows it is 30 times safer riding in a car with a seatbelt than without a seatbelt.

PRINT





Student Page 198



PRACTICE

Direct students to Lesson 1 PRACTICE and have them complete the problems. Address studential rors and miscenceptions

Check Your Understanding

Fill in the blank to complete the multip restive comparison statement for each tape diagram

7 7 7 7 7

3^{pl} is 5 times greater than 7

9 9

18 is 2 times greater than 9

3

4 4 4

12 s 3 times greaterth an 4

4

6 6 5 5 6 8

36 ls 6 times greater than 6

5 Multiplicative Comparisons

LESSON 2 Creating Multiplicative Comparison Equations

Lesson Overview

mithis lesson, students that dign their understanding of multiplication as a method to compare numbers. Students under equations to represent multiplicative combanson statements.

Lesson Essential Question

How can multiplication be used to compare numbers?

Learning Objectives

In this lesson

- Superies will cleate equations to represent multip trative comparison problems
- Students will use letters to represent unknown quantities in equations

Grade-Level Standards

- 4.C.1.a Interpret a multiplication equation as a comparison
- **4.C.1.b** Represent verba statements of multiplicative companions as multiplication equations
- 4.C.1.c Multiply or divide to so we word problems involving multiplicative comparison (for example, using drawings and equations with a symbol for the unknown number to represent the problem).
- **4.C.1.d.**) Use letters in equations to represent unknown quantities.



Vocabulary Check-in

equation, factor, multiplicative comparison, product



Materials List

No add ponel mater als needed



Preparation

No additional preparation/needed

DIGITAL

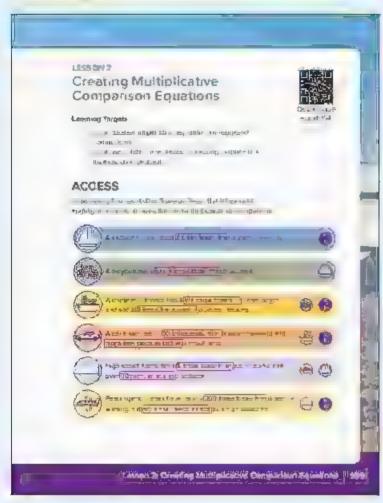


Creating
Multiplicative
Comparison Equations



Spick Code equat4064

Student Page 199



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may a ways write an equation as mown
 Known = ut known, but an equation car also be written as unknown = known = known Both aquations are correct as long as what is on the side of the equal tight equal to what is on the other
- Students may meanertry place the unknown in an equation. For example, the stillers is asked to write 12 p.3 times greater than a they may write 12 x 3 —a, instead of 12 = 3 x a or 3 x a = 12.

Comparing Transportation Speeds

- f. Direct students to Lesson 2 ACCESS Comparing fransportation Speed, Ask voluntéers to read aroud the statements in the Infographic
- 2 Ask students to high ight on circle phrases that show multiplicative comparages, if necessary review the term.

Answer Key for Comparing Transportation Speeds:

- A a lanaf travers a rout 2 times faster than a pers ক কৰাৰ
- b. . . ycle travers 3 to 4 times faster than a salibral.
- A muse fit proveds about the same speed as a fast b cycle are about 8 times the speed of a pers の washing
- Lar travels about 20 times faster than a part of the land and more with twice as fast as a cruse and
- High speed a trains move 8 times faster than a unit with and war 30 times as fast as a sat poat
- Have let a relanes trave near; 200 times faster than a very a rawing, but mare than twice as fast as a give, and train

Lesson 2 • Creating Multiplicative Competison Equations





Multiplicative Comparisons

BUILD (40 min)



Multiplying to Show Comparisons (45 PM)

- 1 Direct students to Lesson 2 Bual D Ma to ying to Show Comparisons
- 2 Read Problem 1. areas and point out the anguage used to express compar sons (4 times greater than). Explain that there is a number missing in the statement. The missing number is represented by a blank, but we can also use letters to represent missing numbers.

- 3 Write on the board 4 times greater than 3 s.a.

 Remind students that the letter represents an whichowh or in soling number. Ask students to record the information from the board in their books.
- Ask students to think about times when they have made multiplicative comparison statements (or neard others make them) outside of school. Share an example, such as, "I want out to buy oranges yesterday and one market was selling them for 2 times as much as another market," or, "It took me 15 minutes to get to school yesterday and 3 times enger to get home."

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- Write on the board: 4 × 3 a. G., lide students to see the connection between use of the word "times" in the multiplicative companion statement and the development of a intuitibilication equation.
- Ask students to bold at Problem 2 and think about how this statement is different from Problem 1. Ask students to share their thinking with a partner
- 8. Ask for volunteers to share their thinking with the whole group. If necessary, explain that in Problem 2 the product is known and one of the factors is unknown
- Write 18 = 6 x b and ask students if they think this is an accurate representation of the multiplicative comparison statement. Allow students to agree or disagree and to share their thinking. Make sure students understand that it does not matter where an equal sign is in an equation as long as what is on one side of the equal sign is equal to what is on the other side.
- 10 Ask students to work with a partner to complete BuilD problems 3-5
- 11 After a few minutes, go over the answers with students. Ask students to share their thinking and to describe the strategies they used to solve the problems.

Answer Key for Creating Equations for Multiplicative Comparison Statements:

Jee Teacher Note

4 14 4 x b

TENCHER MOTE Throughout this unit and moving forward, accept as correct all variations of the equations in problems in Buildia I, rest in a continuous of the equations in the continuous of the equations in the continuous of the equations in the continuous of the c

Lesson 2 . Creating Multiplicative Comparison Equations

Multiplicative Comparisons

Creating Equations for Multiplicative Comparison Statements (15 mm)

- 1. Elizabeth students to sesson 2 BLLD Creating Equations for Multiprocitive Comparison Statements 'Gp over the direct and with students and give them time to work with a partner (Students do not have to solve the equations.)
- 2 As students work, well around the room to monitor their progress. Ask questions to quide their thinking, such as
 - What information does the property give us?
 - What is the unknown?
 - What equation can we use to represent the multiplicative companison?
- 3 At the end of Bull, It, go over the answers with students. Ask students to share their thinking and the strategies they used

Answer Key for Creating Equations for Multiplicative Comparison Statements:

1 1 x 5 = ,
1 1 = || 3 × 25

Exit Ticket

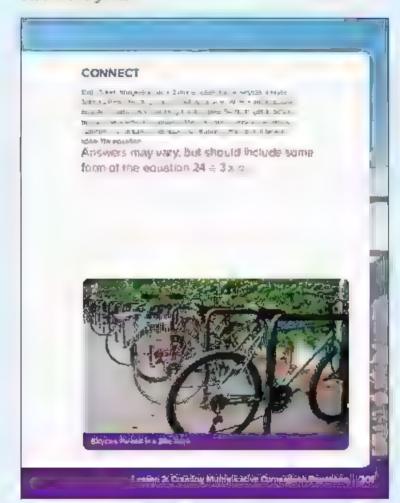
CONNECT (7 min)



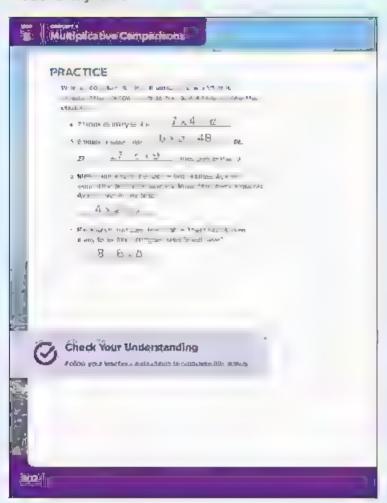


Ask students to turn to Jesson 2 CONNECT Exit Ticket and respond to the prompt

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Studient Page 202



WRAP-UP (3 min)





Let's Chat About Our Learning

Ask student volunteers to share their answers, explain their thinking, aboincide their problem-solving strategy.

"EAC HER MOTE Students' equations may on may not noude an unit of the above of the THE PROTOCOL THE P ing a singulation that we also at on ' ' + 1 your architect three to go over answer is dericaleeting Student E THE ORDER PROPERTY AND A CASE SPEASOR

PRACTICE

Direct students to Lesson 2 PRACTICE and have them complete the problems. Address student enters and miscandeptions

Check Your Understanding

Write an equation for the comparisons. Use a letter to represent the unknown number. You do not have to solve the equations

- 1. 16 is 4 times greater than lo = 4 x a
- 2. 4 times as many as 5 ts: 4 x 5 : b
- 3 Rashadis team score q 9 goals in spoter. This is 3 times as many goals as Yaseen's team scored. How many goas dud Yasseer's team score? 4=3×

Lesson 2 • Creating Multiplicative Competison Equations



LESSON 3 Solving Multiplicative Comparison Equations

Lesson Overview

mitrus lesson, students preste and some multip instale companison equations, lust as in the prey our esson, it is important to mote that the unknown can be in a figure to post one in the equation

Essential Question

 How can multip realizable used to compare numbers?

Learning Objective

In this lesson

 Students will create and sowe must plicative comparison equations

Grade-Level Standards

4.C.1.b Represent verbal statements of multiplicative comparisons as multiplication equations

4.C.1.s Multiply or divide to solve word problems involving multiply or divide to solve word problems and equations with a symbol for the uninteger number to represent the problem)



Vocabulary Check-in

Fiver'se



Materials List

Jvo add motter als meeded



Preparation

No additional preparation/needed

DIGITAL



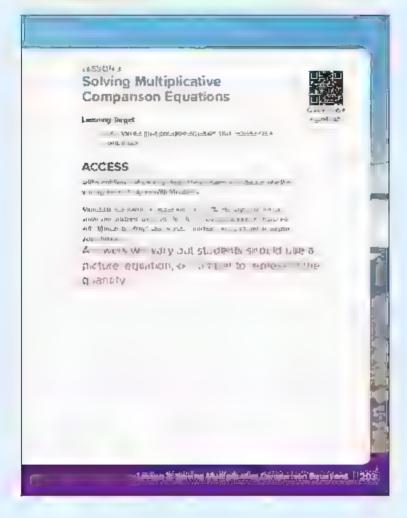
Lesson 3

Solving Multiplicative Comparison Equations



Outdi Code egmt4065

Student Page 203



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may have trouble treating their own compares on statement and equation using the information provided.
- Students may not recognize that multiproation and division factor can inform the relationships they are exploring.

Different Ways of Solving

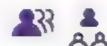
- 1 Direct students to Lesson 3 ACCESS Different Ways of Solving. Read the problem with attidents and assithem to record their responses and explanations.
- Ask students to put a thamb up if they agree, a thumb down if they alsagree, and a thumb to the side if they are unsure. Allow students with thumbs to the side to select students with thumbs up or thumbs down to explain that thinking to the cass if students do not recall their ationship between multiplication and division and of their work with fact fair likes in Primary 3. Explain that multiplication and division are operations so both equal or slare correct.

Lesson 3 · Solving Multiplicative Comperison Equations



5 Multiplicative Comparisons

BUILD (40 min)

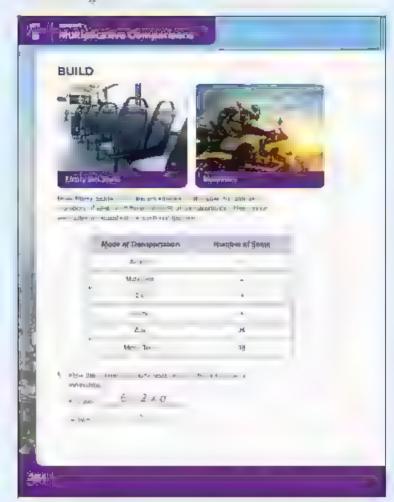


How Many Seats? (40 min)

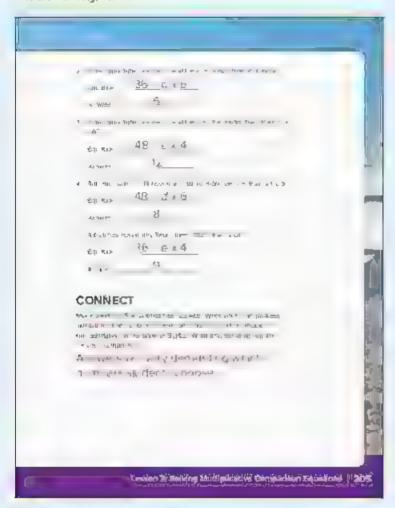
- Ask students in twith at yit mes as many seats are in a car than on a broycle. Ask students to help you solve the problem by providing the following prompts
 - How many seats are in a typical car?
 - How many seats are on a typical bioyole?
 - Which has more seats?
 - What my file icative comparison statement could we use?
 - What equation can we use? (Possible answer 1 x a = 4)
- 2 Explain to students that when they solve an equation, they say or write what the unknown number is. Encourage students to try to so we equations from memory using multiplication facts. However, students may also continue to use the strategies they have "earned to solve multiplication problems as needed."
- 3 Direct students to Lesson 3 B LLD How Many Seats? Ask students to examine the information in the table instruct students to work with a partier to write and solve aprequation that can be used to answer each question.
- 4. With about 10 minutes left in Bull.D. have students share their equations and treft so ations

Answer Key for How Many Seats?:

PRINT



Student Page 205



CONNECT (7 min)



More Seats to Sail

Direct students to Lesson 3 CONNECT More Seats to Sail. Ask students to work independently to write and solve their awn comparison using the information provided.

WRAP-UP (3 min)

D Let's Chat About Our Learning

Ask students to share the comparisons they wrote with the class. Allow several students to share their work and explanations. Encourage students to ask each other questions to clarify their understanding

Lesson 3 • Solving Multiplicative Competition Equations



PRACTICE

Direct students to 'Lesson 3 PRACTICE and have them complete the problems. Address student errors and this conceptions

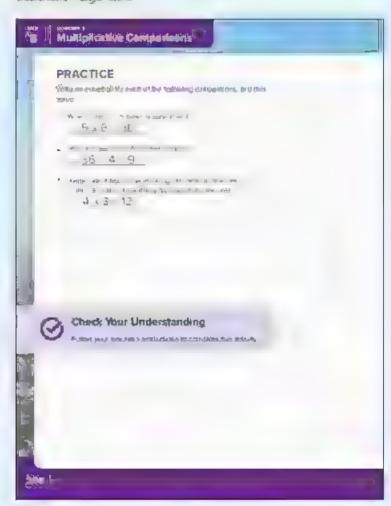
Check Your Understanding

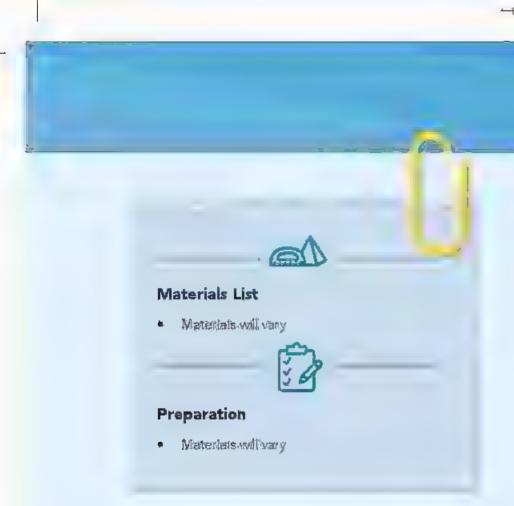
Write an equation for each of the following companions, and then sowe.

- 1 What mulhour is 4 times as many as 87 32 4 x 8 -2
- 2 42 s 6 t mes greater than what number?
 6 x 7 = 40
- 3 A car is about 5 meters long. A bus is about 15 meters long. About frow many times longer is a bus than a car?

 5 × 3 = 15

PRINT





DIGITAL



Concept Check-In and Remediation



Cuick Code egn#4066

Concept Check-In and Remediation

Lesson Overview

In this essent, students work to contectum sconceptions and errors from unit 5 Concept. Multiplicative Comparisons. First, administer the Concept Check in Once you have reviewed the quiz results choose remediation activities based on the needs of your students. Some recommendations are lated below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or in asmal, group with the teacher.

Lesson Essential Question

 Höw canimult, plication be used to compare numbers?

Learning Objective

In this lesson

Students will work to correct misconcept and errors related to multiplicative comparisons

Grade-Level Standards

4.C.1.a nterpreta (hadiplication equation as a comparison

4.C.1.b Represent verbal statements of multiplicative comparisons as multiplication equations

4.C.1.e Multiply or divide to solve word problems may wing multiplicative comparison (for example, using drawings and equations with a symbol for the studiewn number to represent the problem)

Concept Check-in and Remediation



Vocabulary Check-in

Review conteept vocabulary as needed

.1, EFT 1, 15 '14, FFG 45 1111111

- Students may have difficulty by iding conceptual understanding of arrumber being x times greater than another number.
- Students may aways write an equation as known = limbwin = limbwin, but an equation can also be written as thumburg & known > known. Both equintions are correctles long as what is on one side of the equal sign is equal to what is on the other.
- Students may incorrectly place the unknown in an equation. For example, if a student is asked to write 12-is 3 times greater than a, they may write 12 × 3 = a, instead of
- Students may have trouble dreating their own tomporison statement and exput on using the information provided

Remediation: Correcting Misconceptions

H...

Students are having difficulty on liding conceptual understanding of a number being a times greater than another number

Then

Use manipulatives to help them build mult plicative companions. For example, have students create a group of 6 counters and a group of 12 counters. As I them to investigate "how many times" they can make a group of 6 out of the 12. Connect maxing 2 groups of 6 to 12 being 2 times greater than 6. Repeat with other main facts. Resterate the importance of creating equal groups to make the tipolicative companions.

If...

Students have trouble writing equations correctly to represent multiplicative comparisons

Then...

Review Multiplying to Show
Comparisons from Lesson 2. Consider
building on the man pulsive activity to
have students record the relationships
that they are seeing. For example, after
students build a group-of 6 and a group
off 12 and Identify the multiplicative
relationship, they can record the
numbers they used—6, 2, and 12—to
form a multiplication equation. It may
be helpful to start with smaller numbers
and farm lar multiplication facts

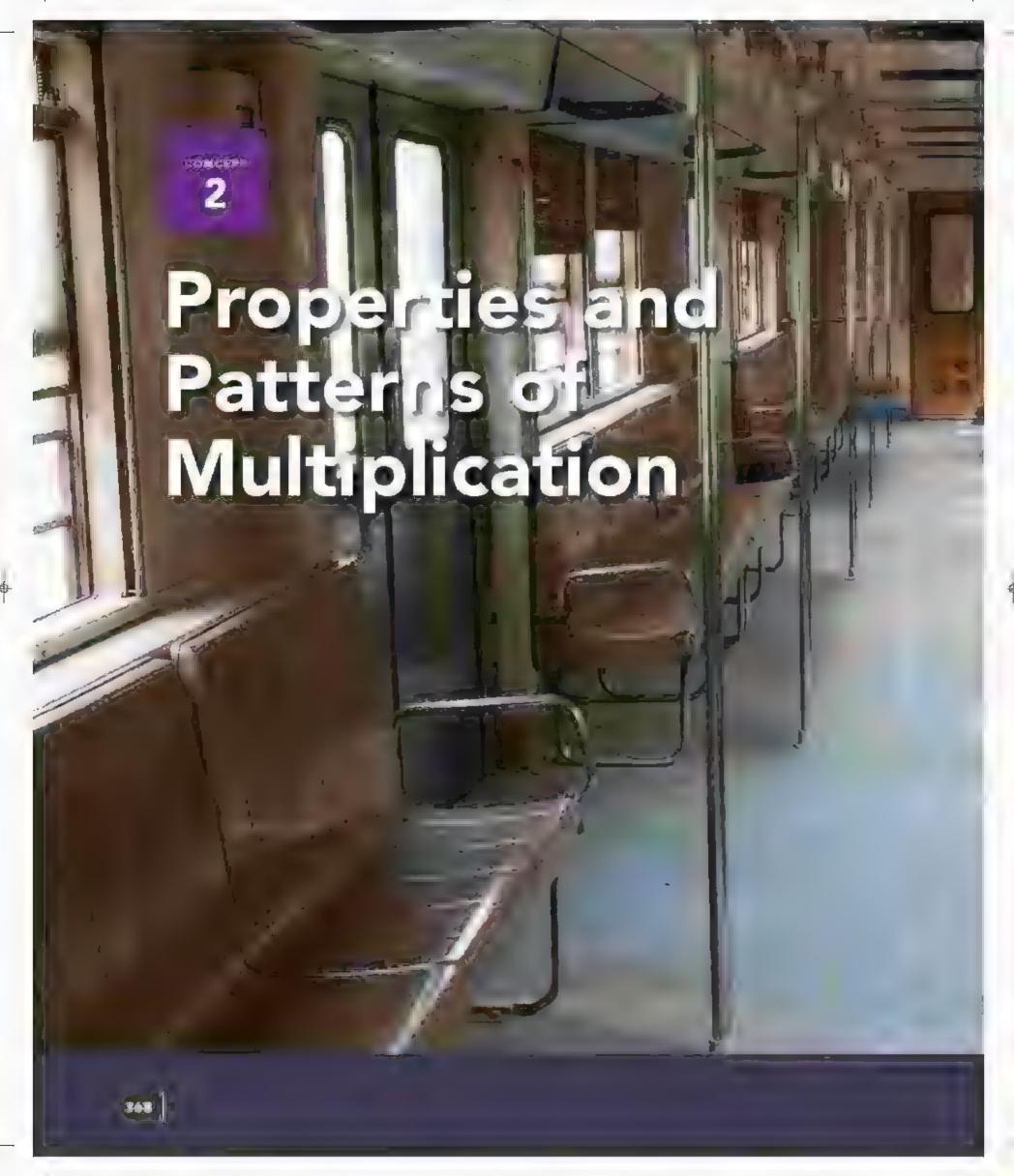
H...

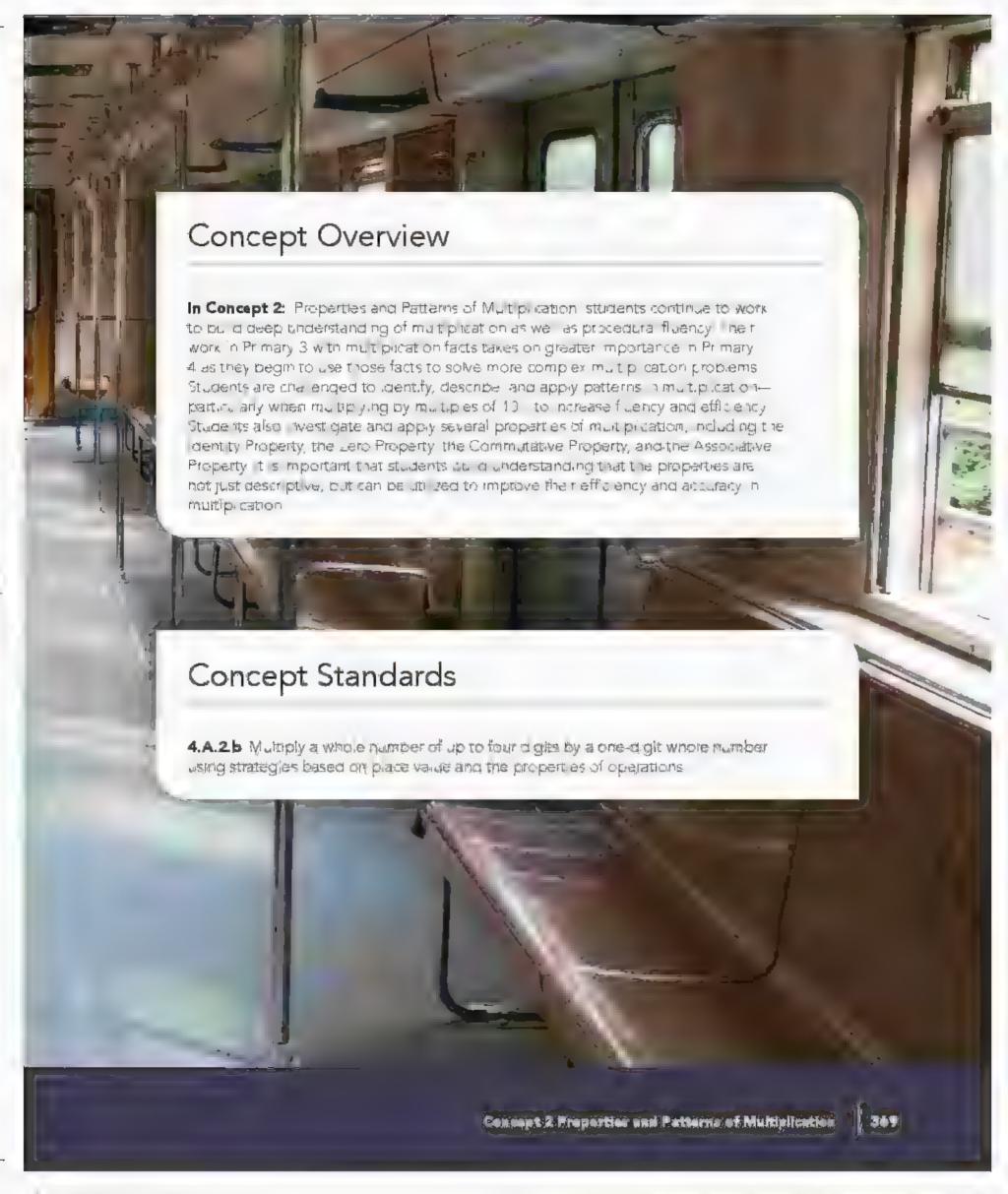
Students do not understand how to use letters to represent unknowns in equations.

Then...

Review M... It.p ying to Show
Comparisons from sesson 2. Build on
the manipulative activity by having
students record the quantities they
are seeing and using a letter written
on a small piece of paper to represent
the number they are so ving for
Remind students that the effert is just
a placeholder. Explain that it is easier
to use letters as placeholders than
numbers because numbers would be
confusing

Concept Chack-in and Remediation

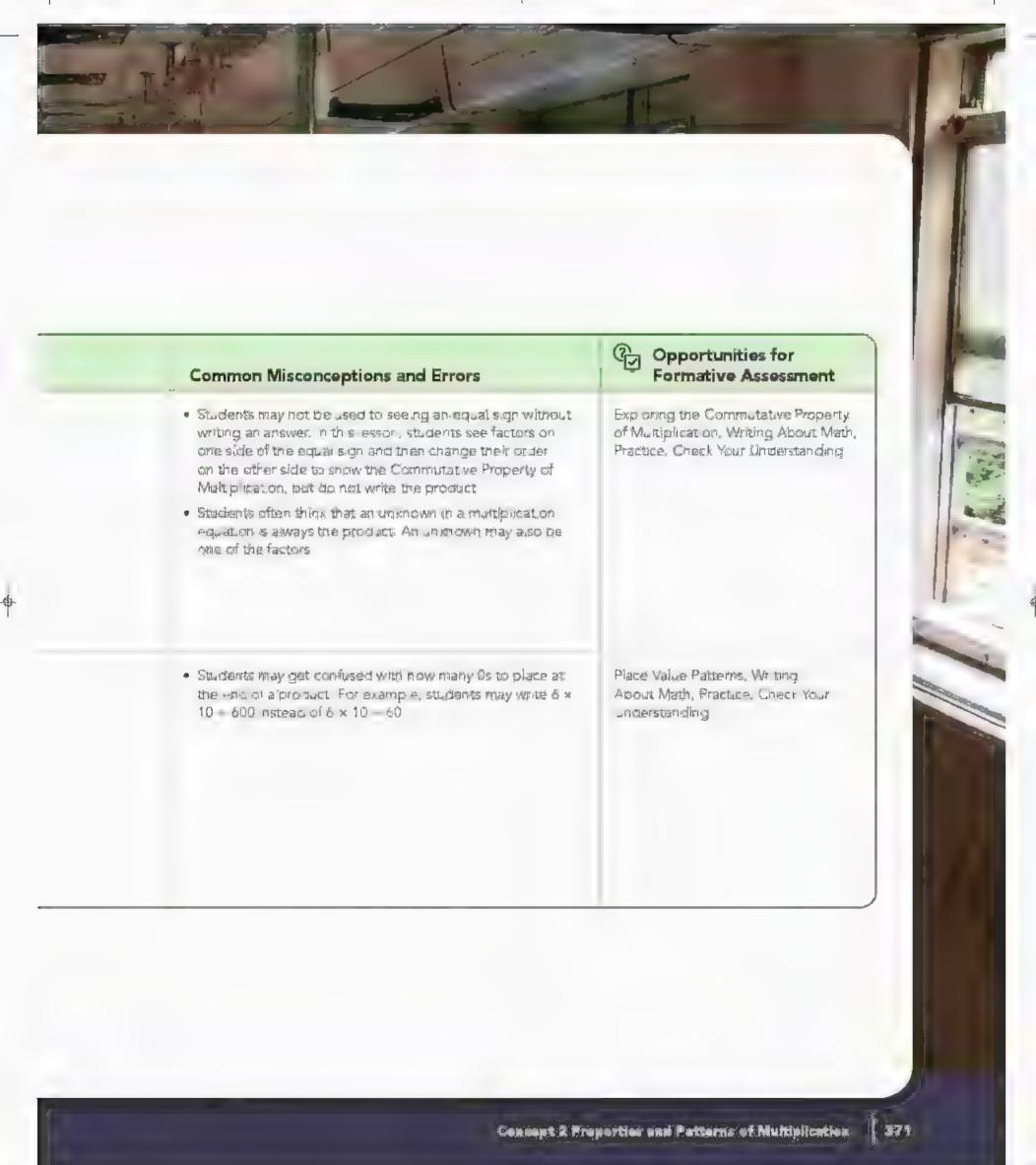




Concept Planner

A lessons are designed to be 60 minutes. The materials is sted in this chart are items to gather for earling group, items for the class or for individual students are and rated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
4 Commutative Property of Mil tiplication	Digit cards 1-9 from Unit 1 (1 set per student) Marirers or crayons Extra graph paper (Optional)	Array Column Commutative Property of Multiplication Factor Horizonta Product Row Vert.ca	Students will explain the Commutative Property of Multiplication Students will apply the Commutative Property of Multiplication to solve problems
5 Patterns of Multip ying, By: 10s	• No additional materials ageded	Repetty of Multiplication Zero Property of Multiplication	 Students will apply the identity Property of Multiplication to solve problems Students will apply the Lero Property of Multiplication to solve problems Students will dentify patterns that occult when multiplying by 10, 100, and 1,000



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- (-1)	-
- Apr	

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
Mr abilitation Anterior in Explicit uf	 9 Spillings (1 per small group) (Priotocopy the Brack, ne Master at the end of this volume. Paperclip (1 per group) Se,ssors (1 per group) 	Multiples	Students will apply place value concepts to multiply by multiply by and 1,000 Students will explain patterns when multiply highly multiples of 10, 100, and 1,000
Exporn J More Patterns in Multiplication	• Ne additions, mater als needed	Associative Property of Multiplication Commutative Property of Multiplication Parentheses	Students Willerplan the Associative Property of Multiplication Students Willapply the Associative Property of Multiplication to so we problems
Applying Patterns in Mi, ftlp leation	• D.git Cards 0—9 (aptional)	Decompose Factors Multiples	Students will apply decomposing and the Associative Property of Multiplication to solve equations with multiples of 10, 100. or 1,000



- Students may get confused with now many 0s to place at the end of a product. For example, students may write 6 × 30 = 1,800 instead of 6 × 30 = 180
- Students may get confused when multiplying by a factor
 with 5 as the leading digit since the product may end in a
 0 already. As a result, they may place the incorrect number
 of zeros to their answer. For example, when multiplying
 5 x 400, students may write 5 x 400 = 200.

Students may have trouble strategically identifying two
factors to multiply first in a problem and always attempt to
multiply the factors in the order they are presented making
the problem more difficult to solve

- Students may factor the multiple of ten into a factor pair that is less efficient to use when applying the Associative Property of Multiplication. This is not actually an error in computation. For example, thinking of 300 as 3 × 100 is the plus, in cowing these problems while thinking of 300 as 5 × 60 is correct but less efficient in this lesson.
- Students may have difficulty applying the properties and patterns they learned in previous leasons to multiplying a two-stigst number by 10, 100, or 1,000. When multiplying 27 x 100, students should recognize 27 x 1 = 27 and place two zeroes in the product.

Opportunities for Formative Assessment

An ting About Math, Practice, Check Your Understanding

Applying the Associative Property of Multiplication, Writing About Math. Practice, Check Your understanding

Multiplying by Multiples of 10, 100, and 1,000, Writing About Math Practice, Check Your Understanding

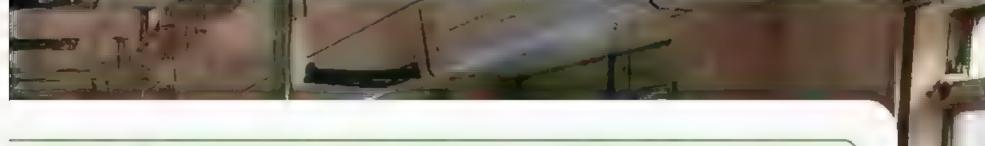
Company 2 Proportion and Patroms of Multiplication

Vocabulary Learning **Objectives** Lesson Name Materials for Lesson Terms Materials will vary Review concept. Concept Students w vecabulary as Check highd work to correct Remediation needed Miscondeptions and errors related to properties and patterns of mu tipocation

in add tion to the assessment opportunities included in this chart, each concept will include a Concept Check-in

Opportunities for Assessment:





Common Misconceptions and Errors

- Students may get confused with now many 0s to place at the end of a product. For example, students may write 6 x 10 600 instead of 6 x 10 60
- Sputtents may get confused when mult prying by a
 factor with 5 as the leading digit since the product may
 end in a Dialeady. As a result, they may place the incorrect
 number of zeros to their answer. For example, when
 mult plying 5 x 400, students may write 5 x 400 = 200
- Students may have trouble strategically identifying two
 factors to multiply first in a problem and always attempt to
 multiply the factors in the order they are presented making
 the problem more officult to solve.
- Students may have difficulty applying the properties and patterns they earlied in previous essons to multiplying a two-digit number by 10, 100, or 1,000



Opportunities for Formative Assessment

Concept Check- in

Commun 2 Proportion and Petrorno of Multiplication

Properties and Patterns of Multiplication

LESSON 4 Commutative Property of Multiplication

Lesson Overview

In this lesson, students review the pancept of the Commutative Property of Multiplication and apply this property to solve equations. Students continue to use a letter to represent an unline which make and interpret their meaning in equations showing the Commutative Property of Multiplication.

Lesson Essential Question

 How cap understanul gloraperties and patterns in multiplication help us solve problems more efficient y?

Learning Objectives

In this lesson

- Students will explain the Commutative Property of Multiplication
- Students will apply the Commutative Property of Multiplication to solve problems

Grade-Level Standards

4.A.2.b Multiply a whole number of up to four digits by a one-digit whole number using strategies based on piece value and the properties of operations



Vocabulary Check-in

array, column, Commutative Property of Multiplication, factor horizontal, product row, vertical



Materials List

- Digit cards 1-9 from Unit 1 (1 set per student)
- Warkers or crayons
- Extra graph paper (Optional)



Preparation

No advance preparation needed

DIGITAL



Lesson 4

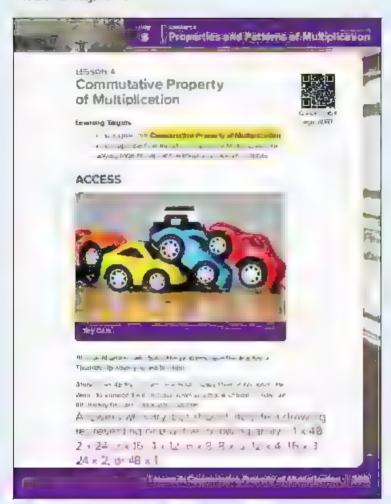
Commutative Property of Multiplication



Quick Code egimt4067



Student Page 209



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students thay not be used to seeing an equal sign
 without writing an ariswer in this lesson, students
 escrizors on one side of the equal sign and then
 change the right on the other side to show the
 Communitative Property of Multip reation, but do
 not write the product.
- Students often think that an unknown in a multiplication equation is always the product. An unknown may also be one of the factors

Toy Car Number Talk

- 1 Direct students to Lesson 4 ACCESS Toy Car Number Talk Present the pick em and give students time to solve it. Tell students to give a Thumbs Up when they are finished
- As students work walk around, and box for students who designed arrays that show 6 rows and 6 columns or 8 rows and 6 columns. Ask these students to draw their solutions on the board and explain their thinking.
- Ask students to talk with a partner about what they
 notice in these solutions use these questions to
 quide their conversations



- De you agree with these solutions?
- What is the same? What is different?
- Are there other ways to display the toy cars?

P. ** +1. https://www.2 x 24, 3 x 16, 4 x 12)

4. Ask students to share their thinking with the group Record or the board other ways students design to display the toy cars.

BUILD (40 min)



Exploring the Commutative Property of Multiplication (40 mm)

Direct students to Lesson 4 Bull Exploring the Commutative Property of Multiplication Ask students to Turn and Talk about what they remember about the Commutative Property of Multiplication. Ask students to record a definition in their own words and an example in the BULD section for this lesson.

TEACHER NOTE The shower benealers in Indoessary.

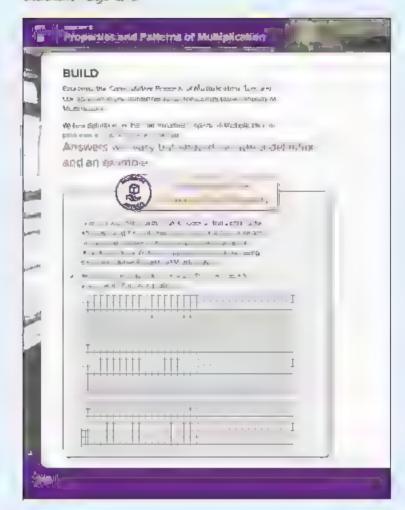
TEACHER NOTE: The shower is a characteristic of the presence of the property of the property

2. Tell students that they will be applying the Commutative Property of Multiplication by drawing arrays. An array arranges objects Into rows and columns. Rows are nonzontal (left right) and columns are vertical (up-down). Each row has the same number of objects and each column has the same number of objects.

Arrays and the Commutative Property (30 mm),

- Direct students to Arrays and the Commutative Property in BuiLD. Ask students to take out their dige sards (1–9) and choose 2 cards
- 2 Gc over the directions with students to make sure they understand the learning activity
- 3 Allow time for students to draw their first pair of arrays and write their first equation. As students work, walk around, and monitor their progress. Offer support to students who are struggling. If many students are struggling, consider having students work in pairs or small groups.
- 4. At the end of BULD, ask student volunteers to share their wark on the board. Encourage students to ask each other questions to build understanding or carrily musconceptions.

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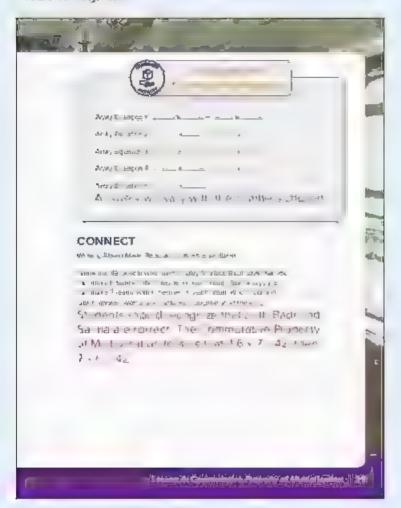








Student Page 211



CONNECT (5 min)



Writing About Math

- 1 Write the terms factor, thus ply, product, equation, array, and Commutative Property of Multiplication, row, and column on the coard
- Ask students to turn to Lesson 4 CONNECT Writing About Math and respond to the prempt. Encourage students to use mathematical vocabulary in their response.
- After a few milliones, as in students to share their throwing with a partner

WRAP-UP (5 min)

What About Three?

- Write on the board: 2 × 5 × 3 = . Ask students to share the product with their Shoulder Partner.
- 2. Ask students fittiney will get the same product if the factors are moved around Discuss Do not ask students to agree on a conclusion at this time. Explain that they will be confirming or revising their thinking to an approximate tesson.

Lauzen 4 Commutativa Property of Multiplication 379

PRACTICE

Direct students to besson 4 PRACTICE and have them complete the problems. Address student errors and intisconceptions.

Check Your Understanding

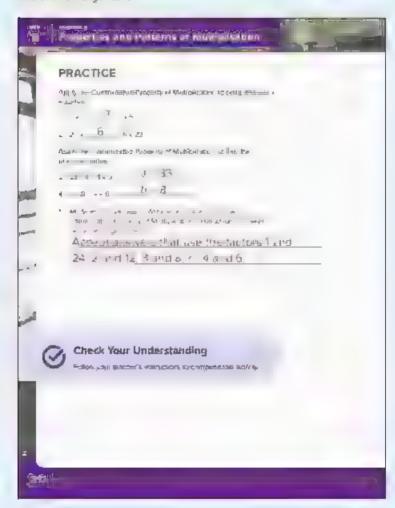
Apply the Commutative Property of Multiplication to complete each equation:

Apply the Commutative Property of Multiplication to find the unknown value

5. Lamian has 40 books. Write an equation using the Commutative Property of Multiplication to describe two ways she can arrange her books.

Except as sweether settle factors. Find 40 Find 11. 4 and 10 or 5 and 8

PRINT







Materials List

No adolficha wieter als needed



Preparation

No advance preparation meested

DIGITAL



Patterns of Multiplying by 10s



Quick Code egnit4068

LESSON 5 Patterns of Multiplying by 10s

Lesson Overview

In this lesson, students apply the fero Property and the identity Property of Multiplication and relate their understanding of multiplication and place value to identify patterns when factors are multiplied by 10, 100, and 1,000 identifying patterns and relationships religious mathematical trunking and enables students to compute mentally and with efficiency.

Lesson Essential Questions

- How does identifying patterns in multiplication problems help us to so ve problems more efficiently?
- How sides understanding place value help me to solve multiplication problems?

Learning Objectives

In this lesson

- Students will apply the identity Property of Multiplication to solve problems
- Students will apply the Zero Property of Multiplication to solve problems.
- Students will identify patterns that occur when multiplying by 10, 100, and 1,000

Grade-Level Standards

4.A.2.b Modifply a whole number of up to four digits by a one digit whole number using strateges based on blace value and the properties of operations



Vocabulary Check-In

Identity Property of Multipircation, Zero Property of Multipication

Lesson 5 - Patterns of Multiplying by 10s

ACCESS (10 min)



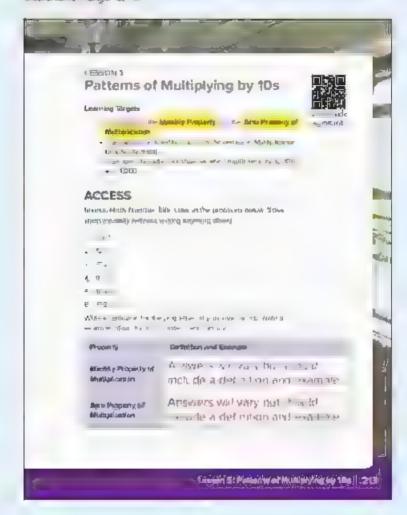
COMMON MISCONCEPTIONS AND ERRORS

Students may get confused about how many 0s
to place at the end of a product. For example,
students may write 6 × 10 600 instead of 6 = 10
1: 60.

Mental Math Number Talk

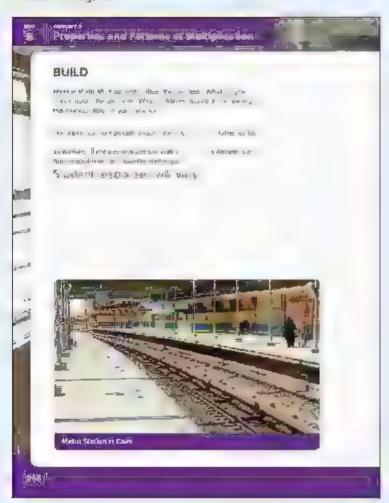
- 1. Direct students to Lesson & ACCESS Mental Math Number Talk. Ask students to solve each problem mantally, raising their hands when they know the answer Ask youriteers to share their answers with the class
- 2 Ask students to Turn and Talk about why they were able to so we these problems mantally. Encourage students to think about the meaning of these problems and what they would bok like if they drew them.
- Invite students to share their thinking with the class Encourage students to use words such as factor, product, afray, nave, columns, and groups in their explanations for example, 5 groups of 1, 1 now of 5, 8 groups of 0, and se on)
- 4 Remind students that any number multiplied by 1 equals the same number and that this is detect the dentity Property of Multiplication. Remind students that any number multiplied by 0 equals 0 and that this is called the Zero Property of Multiplication.
- 5 Ask students to write a definition and an example of each property in their Student Materials

PRINT





Student Page 214



BUILD (40 min)





Mental Math Multiplication (15 m a

- 1 Ask students to them to Lesson 5 BUILD Met tal Math Mult, plication. Ask students to discuss with the whole group what they not ce about the problem and what numbers they think should go in the blanks.
- 2 Ask students to discuss how the problem is the the multiplicative comparison problems they so year in previous respons.
- 3. Tell students the missing, Information in the problem
 - . The metro is 10 times as fast as wa king
 - The average person waits 5 kilometers an nour.
- 4. Ask students what menta, math strategies they would use to solve the problem. Ask student volunteers to model their strategies for the class.

THE A P IE Suma sturents may know the treath fact the TO, some implication country to the country to

का accurate को नेस् ares of the store relative management of some countries, mesself

Place Value Patterns

- 1 Review blace value with students. Ask students to recal how to draw Ones, Tens Hundreds, and housands on a place value chart.
 - Ones—tiny square

iiii

• Tens - roa

Lesson 5 - Patterns of Multiplying by 10s





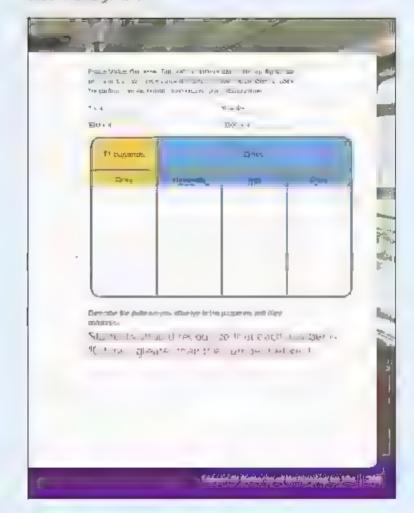


Thousands - cube



- 2. Direct students to Lesson 5 BUILD Place Value Patterns. Ask students to work with their Shoulder Partner to draw place value models to so we the problems Remind students to look for patterns in the problems and solutions.
- When impost students are finished, regroup the who eclass. Ask questions to extend students to nking about the problems trey so year. Including the following, recording students: thinking on the board
 - What patterns did you see in your place value drawlings?
 - What patterns did you observe between the problems and their solutions?
 - Based on the patients you observed what other strategres could you use to solve these problems mentally?
- 4. Ask students to think about the mathematics concepts they explored today: the Identity Property, the Earo Property, and multiplying by 10 or multiples of 10 Engage students in a whole group discussion. Ask the following questions, can fying misconceptions and errors as needed.
 - What did these concepts have in common?
 - Why do you think we learned about these preparties and patterns today?
 - Here can knowing these properties and patterns help you solve multiplication problems mentally?
 - What other properties or patterns do you know that might help you solve multiplications quickly and efficiently?

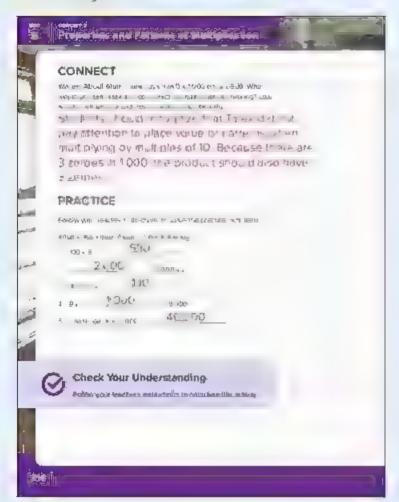
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Student Page 216



CONNECT (7 min)





Writing About Math

Direct students to COMNECT Writing About Math and ask them to respond to the prompt. Encourage students to use the mathematical terms they learned today to support their explanations.

WRAP-UP (3 min)





(T) Let's Chat About Our Learning

- 1 Ask students to share their Writing About Math entries. Encourage them to use appropriate mathematica (termnology to support their thinking.
- finecessary, explain that knowing properties of mattiplication and recognizing patterns makes it easier to solve multiplication efficiently it also helps us to understand relationships between numbers especially when working with larger numbers.

PRACTICE

Direct students to Lesson 5 PRACTICE and have them complete the problems. Address student erfors and importopitions.

Check Your Understanding

- 1 A person can wall about 5 kilometers an hour. The average plane flies 100 times faster than that in the air. How fast can the average plane fly?

 500 ...onveters an Iron
- 2 20 2 × 10
- 3 8 × 100 800
- 4. $7 \times 1.000 = 7.000$

Lesson 5 - Patterns of Multiplying by 10s



5 Properties and Patterns of Multiplication

LESSON 6 Review Exploring Patterns in Multiplication

Lesson Overview

in this lesson, students extend their understanding of patterns in my tip cation, developed when they multiple digital imbers by 10, 100 and 1,000. They apply this knowledge to find the products of single-digit numbers and multiples of 10, 100, and 1,000.

Lesson Essential Questions

- How cap understanul glor specifies and patterns in multiplication help us to solve problems more efficient y?
- How-does understanding place value help me to some multiplication problems?

Learning Objectives

in this lesson

- Swatches will apply place value contespts to multiply by multiples of 10, 100 and 1,000
- Students will explain patterns when multiplying by multiples of 10, 100, and 1,500

Grade-Level Standards

4.A.2.b Multiply a whole number of up to four eights by a one-digit whose number using strategies based on place value and the properties of operations.



multiples



Materials List

- 9 Sowmer (1 per small group)
- Paperosp (1 per group)
- Scissors (il per group)



Preparation

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DIGITAL



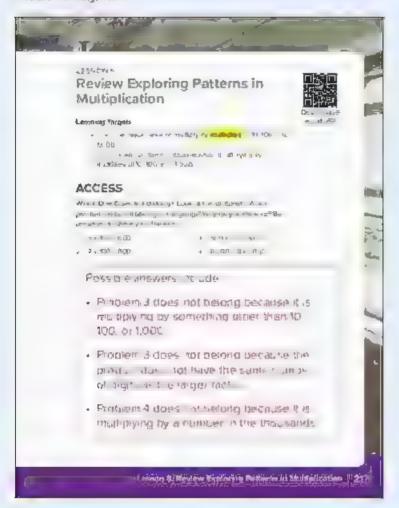
Review Exploring
Patterns in
Multiplication



Autok Ceda egg#14069



Student Page 217



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may geticonfused with how many 0s
 to place at the end of a product flor example,
 students may write 6 × 30 × 1,800 materal of 6 × 30 × 180
- Students may get confused when multiplying by a factor with 3 as the leading digit since the product may end in a 0 aready. As a result, they may place the incorrect number of zeros to their enswer. For example, when multiplying 5 × 400, students may write 5 × 400 = 200

Which One Does Not Belong?

- Direct students to Lesson & ACCESS Which One Does Not Belong? Ask students to look at the four problems and decide which problem does not belong in the group
- When students are ready, as you hears to share their answers and reasoning with the class. Ehrourage students to use mathematica term no ogy to support their extrahations.

Poss is a answers include

- Processor glacostboothing section
 no no go sprathing section
 a description
- From Property to the participation of the participation.
- Phi enal distribution of the transfer of the
- 3 Explain to students that they will continue to apply what they have learned about place value, multiplication, and patterns to so we problems.

Leacon & Review Exploring Patterns in Multiplication | 357

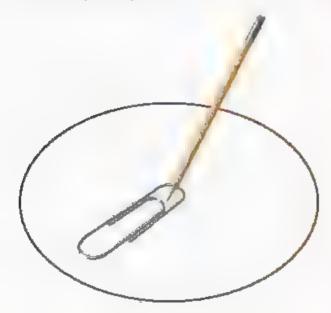
BUILD (40 min)

Connect and Extend (10 mm)

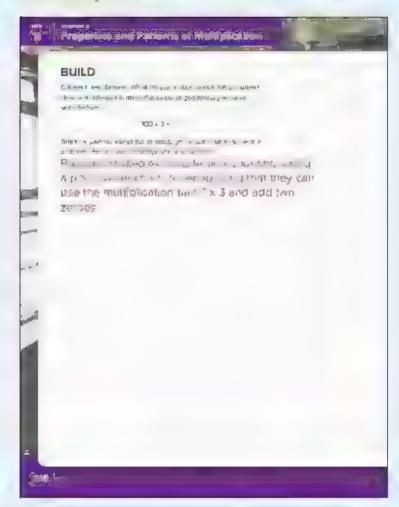
- 1. Direct students to Lesson & BUILD Connect and Extend. Ask students what they notice about the problem 'How is it different from or the same as problem they have seen before?
- 2 Ask students to share their trinking with their Shoulder Partner and discuss what strategy they would use to solve the problem. (Possible strategies recorded skip counting, using a place value shart, or recognizing than they can use the multiplication fact, 7 × 3 and adoptive zeroes)
- Asi students to share their thinking with the whole group. If no students mention the strategy of using multiplication facts, explain it along with the pattern of zeroes in the factor 700 and product 2 10.7

Spinning for Factors (30 m n)

Divide students into small groups. Distribute a fifth niter and paper cup to each group. Explain to students how to use the spinner place the paper cup at the center point of the spinner, procedure point of the spinner, and flick the paper clip to make it spin around the panel point.



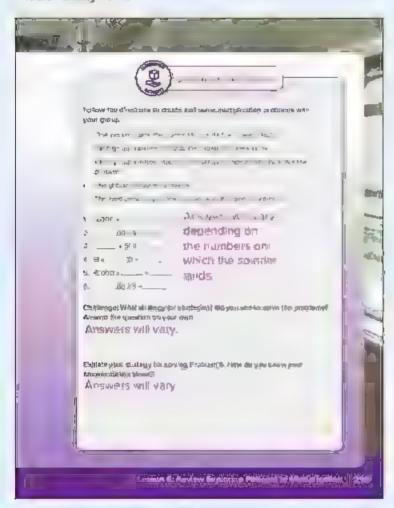
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Student Page 219



- Direct students to Lessor 6 Bull DiSpinning for Factors. Explain to students that they will use the spinner to create multiplication problems. For example, one student spins the spinner and alignoup members record the number in their books. Then, alignoup members apply a strategy to independently solve the problem and their compare their abovers with the group.
- 3 Give students time to play the game. Students who finish early should answer the Challenge question
- As students play, walk around and moritor them work. Ask groups to share some of the riedual, ons and answers with your Take note of any errors being made by multiple students so you can address them. Offer support as needed
- 5. After about 20 minutes, step students and direct their attention to Problem 6
- Ask each group to share the number they spun for Problem 6 and the product they found. Record each group's equation on the board as follows:
 - Write-the equations for which students splin an even number in one country
 - Write the equations for which students spun an odd number in a second column
- 7 Ask students to compare the products of the even-spin equations and the odd-spin equations
- 8. Ask questions to help students recognize that, when the spun factor is even, there is a ways an extra 0 in the product. For example, 200 × 5 = 1,000, 200 has two zeroes that 1,000 have two zeroes.

Lesson 6 - Review Exploring Patterns in Multiplication



CONNECT (7 min)



Writing About Math

- Ask students to turn to Lesson & COMMECT. Writing About Math. Direct students' attention to the mages of Usain Bolt and the Blackbird aircraft. Explain that Usain Bolt is the fastest man in the world and the Blackbird is the fastest plane in the world.
- 2. Ask students to work Independently to respond to the Writing Apost Main prompt

WRAP-UP

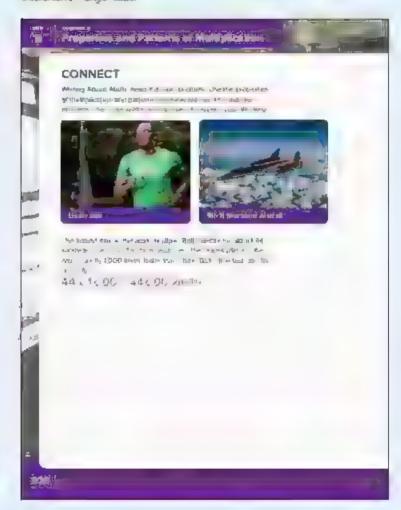


Let's Chat About Our Learning (3 mm)

I Ask students to share their answers and explain their problem-solving strategies. If no students mention them, explain that students could use the Identity Property of Multiplication and patterns for multiplying by 1,000.

Answer Key: 44 × 1 000 = 44 000

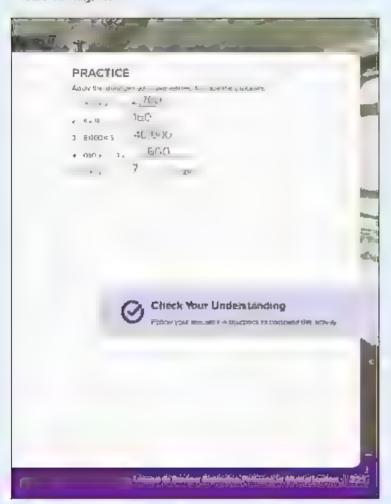
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PRACTICE

Direct students to Lesson 6 PRACTICE and have them complete the problems. Address studentierrors and impropertions

Check Your Understanding

Apply the strategies you have learned to solve the problems

- 1 80 × 6 = 450
- 2 12.0.0 4,000 x 3
- 3. 200 × 9 = 1 o.C.
- 4. 5 × 400 = 2 No

LESSON 7 Exploring More Patterns in Multiplication

Lesson Overview

of M., tiplication and compare at to the Commutative Property of M., tiplication and compare at to the Commutative Property of M., hips cation. Students by idlunderstanding that of angles, the grouping of factors in a thirt, plication propiem with three factors goes not creating the product Students are introduced to parentheses in computation and solve multiplication problems involving parentheses.

Lesson Essential Questions

- How can understar or g properties and patterns
 In multiplication help us to solve problems work
 efficiently
- How does understanding place value help me to solve multiplication problems?

Learning Objectives

in this lesson

- Students will expend the Associative Property of Multiplication
- Students will apply the Associative Property of Multiplication to solve problems

Grade-Level Standards

4.A.2.b Multiply a whole number of up to four digits by a one-digit whole number using strated as based on place value and the properties of operations.



Vocabulary Check-in

Associative Property of Multiplication, Commutative Property of Multiplication, parentheses



Materials List

No additional materials meeted



Preparation

No edvance preparation meeded!

DIGITAL



Losson 7

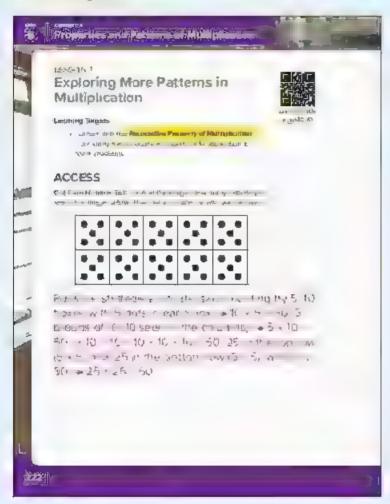
Exploring More Patterns in Multiplication



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Studient Page 222



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

Students may have trouble strategically
Identifying two factors to multiply first in a
problem and always attempt to multiply the
factors in the order they are presented making the
grob am more difficult to some.

Dot Card Number Talk

- 1 Direct students to Lesson 7 ACCESS Dot Card Number Talk Give students about 15 seconds, and then ask them to give a Thumbs up if they know how many dots are instrumented.
- Ask students to share their strated as and record their problem-solving processes on the biladiusing humbers, words, and pictures. At this time, honor all answers and do not inform students as to whether or not their responses are accurate. As students share their thinking, other students can give a linumbs up if they agree. A low students to quest on and others each other's strategies.

Possible strategies include

- · Skip counting by 5
- 10 bexes with 5 dots in each pox → 10 × 5 = 50
- 5 groups of 10 (10 seen in the columns) → 5 ×
 10 = 50 or 10 + 10 + 10 + 10 + 10 = 50
- 25 in the top row (5×5) plus 25 in the bottom row (5×5) which is $50 \longrightarrow 25 + 25 = 50$
- 3 Encourage students to identify similarities and differences between strategies and to make cornections to previous lesson. If no students mention the Commutative Property of Multiplication or patterns when multiplying by 10, help students to make connections by writing 5 × 10 10 × 5 on the board of hecessary, use this to review the content from previous essons on multiplying by 10.

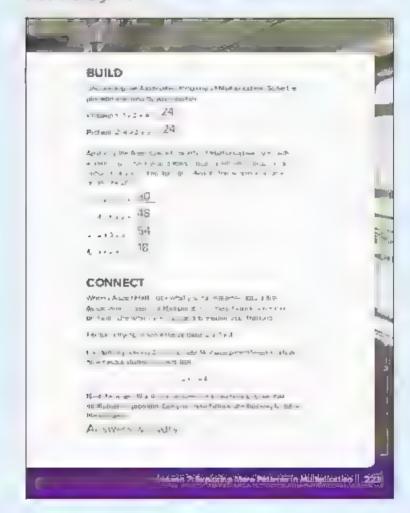
BUILD (40 min)

- 1 Ask Students to turn to Lesson 7 Build uncovering the Associative Property of Multiplication
- 2 Dwide the class ruhatt Ask the half of the students to solve Problem 1. Ask the other half to solve Problem 2.
- Write 3 x 2 x 4 on the board and ask a student from that group to share the product. Ask group members to confirm that they get the same answer
- 4 Repeat the process with 4 x 2 x 3
- T. With both problems and products written on the poard, as i students to share what they Notice and Wonder about the problems they see on the board.

Possible student responses

- Notice) Both multiplication problems are equal to 24
- (% ofice) The problems have the same factors in them
- (Notice) The order of the factors in each problem is different
- (Wonder) Can you always change the order of the factors in a multip leation problem and st get the same product?
- 6. If students do not share the Wonder question pose the question to students as something you are wondering. Tell students they have "Listiancovered a multiplication property called the Associative Property of Multiplication.
- Ask students to recall the other multiplication properties they have learned (Commutative, dentity, Jero). If necessary, provide hints to help students remember
- 8. To student's traitthe Associative Property of Multip loation arrows as to group the factors in a multiplication problem in any order and struget, the same product

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Applying the Associative Property of Multiplication (20 Inc)

- 1. Write the proplem 8 × 2 × 3 in ... on the board
- 2 Ask a student to restate the Associative Property of Multiplication if necessary terming students that the property talk as when we have three or more factors in a multiplication problem, we can multiply any two factors first
- 2 Do a Thiru A oud to model a problem-solving strategy. The following is a suggested process.
 - First, will tay to solve the problem in the order that the factors are written
 - can put parentheses around the part of the problem , w.l., solve first.
 - Write parentheses around the 8×2 so that the problem reads $(8 \times 2) \times 3$
 - Inow that 9 × 2 = 16 But what is 16 × 31
 - Write 8 x 2 = 16, 16 x 3 = ₹
 - Since 16 x 3 is not a basic multiplication fact, I am going to try something different
 - Input that because of the Associative Property of Wultup: cation, I can
 multiply any two factors together first and get the same answer. So, am going
 to multiply 2 × 3 first. Twill put parentheses around 2 × 3 because and no not co
 solve that part first.
 - Write 8 x (2 x 3)
 - know that 2 x 3 6
 - Wrte 2 x 3 = 6
 - Now 1 just need to multiply 6 x B
 - · Write 5 x 8 = 48
 - Add the answer to the equation so it reads 8 × (2 × 3) = 48.
- 4 Ask students what questions they have about the problem-solving process you just madeled. Clear up in sconceptions before moving on
- 5 Direct students to Lesson 7 Bull Di Applying the Associative Property of Multiplication and goldver the directions with students. Ask students to work with a partition to list what they know about the Associative Property to sowe the problems.
- 8 At the end of $B \perp L D$ go over the answers with students. Ask students to share the different ways they arranged the factors

Answer Key for Applying the Associative Property of Multiplication:

				_	
1	31		٨		3.
÷	4 1	-	,	-	10
.,	ē	Ġ	V		54
4	2.	Ţ.		7 -	14

CONNECT (7 min)



Writing About Math

Direct students to lessen / COMNECT Writing About. Math and tead the directions aloud. Ask students to respond to the prompt.

WRAP-UP (3 min)

Let's Chat About Our Learning

- As students to share their so thous to the Writing About Math problem and expandition their making
- 2. Ask students to explain how they used the Associative Property of Multiplication to solve the problem

PRACTICE

Direct students to "Lesson 7 PRACT.CE and have them complete the problems. Address student errors and misconceptions."

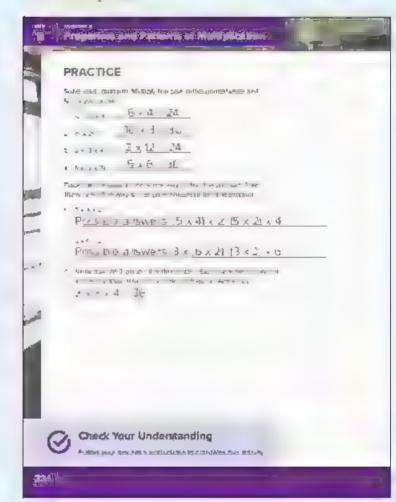
Check Your Understanding

Solve each problem Multiply the part in the parentheses first. Show your work

Solve each problem. Place parentheses to indicate how you arouped the factors. Show your work

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Materials List

Digit cards 0=9 (ppagnal)



Preparation

No additional materials needed

DIGITAL



Lesson B

Applying Patterns in Multiplication



Culick Code egnnt4071

LESSON 8 Applying Patterns in Multiplication

Lesson Overview

n this esson students write a multiple of 10, 100, or 1,000 as 10, 10, 100 or 1,000 They then use the Associative Property of Multiplication to show another way to solve proplems with a one-origin number and a multiple of 10, 100, or 1,000

Lesson Essential Questions

- How can understanding properties and patterns
 in multiple eation halp us to some problems more
 efficient V?
- How does thidefstanding place value new me to some multiplication problems?

Learning Objective

in this lesson

 Students will apply decomposing and the Associative Property of Multiplication to solve equations with multiples of 10, 100, or 1,000

Grade-Level Standards

4.A.2.b Multiply a whole number of up to four digits by a one-digit whole number using strategies based on place value and the properties of operations



Vocabulary Check-In

decompose, factors, multiples

Lasson 8 • Applying Patterns in Multiplication



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

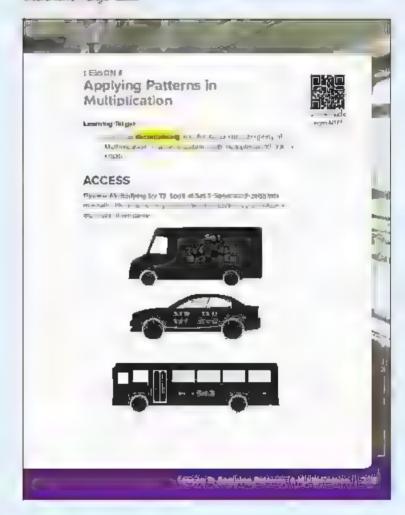
- Students may factor the multiple of ten
 into a factor pair that is less efficient to use
 when applying the Associative Property of
 Multiplication. This is not actually an error in
 computation, for example, thinking of 300 as
 3 × 100 is neighbor to solving these problems
 where thinking of 300 as 5 × 60 is correct but less
 efficient in this lesson.
- Students may have difficulty apply 1 githe properties and patterns they befored in previous assons to nitritiplying atmodesight number by 1.0, 100, or 1,000. When multiplying 27 = 100, students should recognize 27 × 1 = 27 and place two zeroes in the product

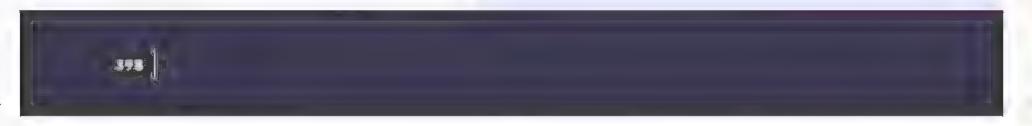
Review Multiplying by 10

- Direct students to Lesson 8 ACCESS Review
 Multiplying by 10 Present students with problem
 Set 1' Tell students to solve these problems
 mentally
- 2. Ask students to reflect on any connections or patterns they notice in the problems in Set 1.
- 3 Use Calling Stoke to select students to share their trunking. Record students' thinking on the board to make it visible for all students.
- 4. Repeat the process with Sets 2 and 3. Encourage students to draw conclusions about the patterns they w... observe when they multiply numbers by 10.

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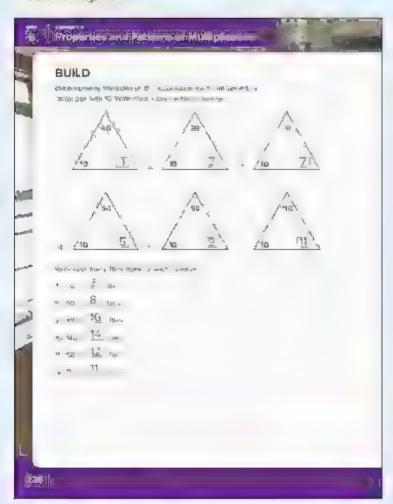






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Student Page 226



BUILD (40 min)

Decomposing Multiples of 10 (10 mm)

- Direct students to Lesson 8 BUILD Decomposing Multiples of 10
- 2 Ask students to work with a partner to some Problems 1 &



3 After a few minutes, go over the answers together

Answer Key for Decomposing Multiples of 10 (1-6): 1 4 2 2 3 7 4 5 5 9 6 11

- 4. Explain to students that they just decomposed these numbers into factors. Remind students that knowing how to decompose a number is especially helpful when working with larger numbers.
- Tell students that this time they will write the number of Tens in each number. Mode the first problem for the students, if reeded. Ask students to work with a partner to solve problems 7–12

Answer Key for Decomposing Multiples of 10 (7–12): 3 5 9 9 10 7 11

Multiplying by Multiples of 10, 100, and 1,000 (30 min)

- 1 Direct students to Lesson 8 Build Multiplying by Multiples of 10. Share with students that today they will be applying the Associative Property of Multiplication and decomposing multiples of 10. 100, and 1,000.
- Do a Think Albud to impdel a problem-solving strategy for the Example problem. A suggested process to lows.
 - Let's por at the example problem 7 x 20
 - Write I × 20 = ____ on the board

- In this problem we have a 1-digit number (7) being multiplied by a multiple of 10
 (20)
- One way to sowe this problem is to use what we know about decomposing and the Associative Property of Multiplication.
- I know that 20 is the same as 2×10 , so I am going to decompose 20 into 2×10 . Those are easy numbers to multiply
 - Decompose: 20 on the board as follows



- The Associative Property of Multiplication fells me that I can group these factors
 any way want to I am going to multiply 7 x 2 first because they are not multiples
 of 10
 - Draw parentheses around 7 x 2
- 7 × 2 equals 14, so 1 will write that under the problem
 - Write the equivalent expression 14 x 10 below the problem
- remember in previous resons that when we multiplied a number by 10, we used
 the dentity Property of Multiplication and discovered a pattern in the number
 of process in the factor and the product 1 know that 14 is going to stay 14, but
 because i am multiplying by 10-1 need to edd at 0
 - Write 14 x 10 = 140 on the board

TEACHED INCATE Students may be able to solve 7 x 20 using the object, e.g., as the girl

TEACHED INCATE Students may be able to solve 7 x 20 using the object and students in a discrete

TEACHED INCATE Students object to solve a solve of state

TEACHED INCATE STUDENTS STUDE

- 3 As students to help you solve Problem 1 Encourage students to tell you what problem-so ving steps to take and to explain their reasoning. Show the Work on the board if necessary, ask questions to sour thinking, such as
 - How can we descripose 50 into a factor pair?
 - How can we rewrite the equation with the new factor pair?
 - Where should we put the parentheses?
 - What is the answer to the problem?
- 4 If students are ready, have them work with a partner to solve Problems 3 and 4 Attenutively, have some students work with a partner while you work with students who need additional instruction and support.
- 5 With about 5 minutes left in Bu . D, go over the answers with students

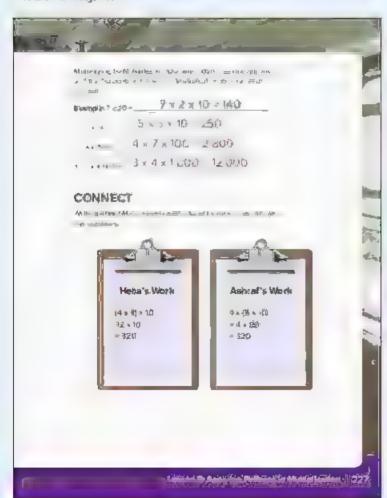
Answer Key for Multiplying by Multiples of 10, 100, and 1000:





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CONNECT (7 min)



Writing About Math

Direct students to Lesson 8 CONNECT Writing, About Math and ask trien to respond to the prompt.

WRAP-UP (3 min)



As students to share with the group which strategy they preferred in the COMMECT problem and explain why

Lasson 8 - Applying Patterns in Multiplication



PRACTICE

Direct students to Lesson & PRACTICE and have them complete the problems. Address student errors and improveptions

Check Your Understanding

Descripose each multiple of 10 before solving

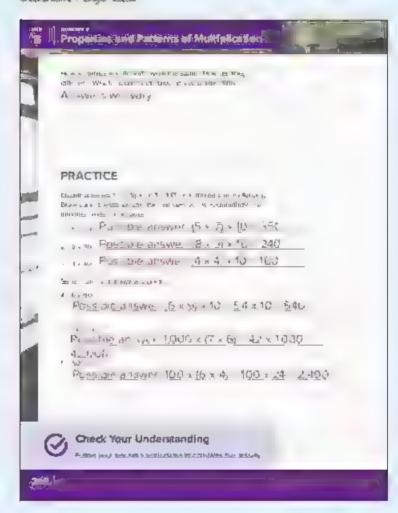
- 1 7 × 40 7 × 4 × 1/ = 50
- 2 5×90 5×9×10=450

Solve using the strategy you prefer

- 3 80 × 5 4 ...
- 4 A × 900 · · · · ·

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Materials List

Materials will vany.



Preparation

Materials will vary

DIGITAL



Concept Check-In and Remediation



Quick Code egrat4072

Concept Check-In and Remediation

Lesson Overview

In this essent students work to connectum sconceptions and entors from Concept 2 Properties and Patterns of Multiplication First, seminister the Concept Check in Once you have received the quiz results ichoose remed at on activities based on the needs of your students. Some recommendations are lated below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or his armail, group with the teacher

Lesson Essential Questions

- Do the properties of addition net apply to subtraction? Why or why not?
- How many ways can I add and subtract?
 - · Which way is the most efficient?
- How can estimation help me be accurate?
- How many different ways car : add?
 - · Which way is the most efficient?
- How many different ways car subtract?
 - · Which way is the most efficient?

Learning Objective

In this lesson

Students will work to correct misconcept insight and errors related to properties and patterns of multiplication.

Grade-Level Standards

4.A.2.b Multiply a whole number of up to four digits by a one-digit whole number using strategies based on place value and the properties of operations.

Concept Check in and Remediation





Vocabulary Check-In

Review concept vocabulary as needed

COMMON MISCONCEPTIONS AND ERRORS

- Students may get confused with how many 0s to place at the end of appropriat. For example, students may write $6 \times 10 = 800$ instead of $6 \times 10 = 60$.
- Students may get confused when multiplying by a factor with 6 as the leading digit since the product may end in a 0 aready. As a result, they may place the incorrect number of zeros to their arrawer. For example, when multiplying 5 = 400, students may write $5 \times 400 = 200$.
- Students may have trouble strategically identifying two factors to multiply first in a problem and always attempt to multiply the factors in the order they are presented making the problem-more difficult to solve
- Students may have difficultly applying the properties and patterns they learned in previous lessons to multiply tig a two-digitiriumper by 16, 100, or 1,000.

Remediation: Correcting Misconceptions

H...

Students are strugging to solve problems using the patterns of multiples of 10

Then

Review Place Value Patterns from Lesson 5 and Spinning for Eactors from Lesson 6. Consider using Tens rods to help stillents make concrete connections between skip counting by 10 and multiplying by 10.

Him

Students have multiplying a single-digit factors

Thomas

Review Applying the Associative
Property of Multiplication from Lesson
7. Consider using counters to build
amays to support understanding of the
concept (for example 3 arrays of 4 by 2)

If...

Students struggle to thirly strategically when grouping factors when multiplying 3 digits.

Then...

Review Lesson 7 Consider having multiplication tables for students to refer to as they solve multiplication problems with three factors. Encourage students to boar for numeric relationships that will help them group factors in a way that makes problems easier to solve Review friendly multiplication in impers, such as 2, 5, and 10, and patterns they have observed when multiplying by multiples of 10.

Concept Check-in and Remediation



Unit Storyline



Unit 6 Factors and Multiples Storyline

The Factors and Multiples unit extends students' working knowledge of the relationship between multiplication and dission to solve problems. Students apply these understandings to find the factors of numbers using a variety of tools and strategies. To support learning, students observe video footage and investigate problems related to different modes of transportation to enhance their understanding of factors and multiples.

Unit Standards

4.C.2	Gan famuarity with factors and multiples	1
4.C.2.a	Demonstrate understanding that a whole number is a multiple of each of its factors	
4. C. 2. a.l	Find a factor pairs for a who entumber in the range 1-100	
4.C.2.b	First common multiples between two numbers	
4.C.2.c	Find the greatest common factor between two whole numbers	

ADS

If Mathematics instruction is based on 60 minutes/5 days a week, deliver the lessons as written in the Teacher Edition.

Concept 1: Understanding Factors

Lesson 1

Lasson 2

Identifying Factors of Whole Numbers

Learning Objectives

- Students will define factors of a whole number.
- Students will find all factors of a given number between 0 and 100
- Students will explain patterns they observe in numbers that have 2, 5, or 10 as factors

Student Learning Targets

- can define factors of a whole number
- can dentify factors of a whole number
- I can explain patterns, observe, himbersthat trave 2, 5, or 10 as a factor

Prime and Composite Numbers

Learning Objectives

- Students will find a factors of a given number between 0 and 100
- Students Will explain patterns they observe in numbers that have 3, 6, or 9 as factors.
- Students will determine if a number is prime or composite.

Student Learning Targets

- rearr dentify factors of a whole number
- can explain patterns, observe in numbers that have 3, 5, or 9 as factors.
- can determine fa number is prime or composite.

Unit 6 Factors and Multiples

Factors and Multiples

Unit Structure and Pacing cont'd

Greatest Common Factor

Learning Objectives

Lesson 3

- Students will find common factors between two whole numbers
- Students will identify the greatest common factor between two whole numbers

Student Learning Targets

- l'can find common factors between two whole numbers
- I can identify the greatest common factor between two whole numbers

Concept Check-In and Remediation

Learning Objective

 Students will work to correct miscenceptions and errors related to identifying factors of whice numbers

Student Learning Target

 I can correct my miscenceptions and errors related to finding all efficient of a runt bell.

Concept 2: Understanding Multiples

Identifying Multiples of Whole Numbers

Learning Objectives

- Students w.l define multiples of whole numbers
- Students w.l. dentify multiples of whole numbers

Student Learning Targets

- · can define multiples of whole numbers
- Loan glantify that tip es of whole humbers

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Lesson 4



Common Multiples

Learning Objective

Lesson 5

Students will dentify common to be between two mumbers

Student Learning Target

transidentify common multiples of two numbers

Relationships between Factors and Multiples

Learning Objectives

Lesson é

- Students will explain the relationship between factors and multiples
- Students will determine if a number is a factor or a multiple of another humber.

Student Learning Targets

- can explain the relationship between factors and multiples
- Tean determine if a number is a factor or a multiple of another number.

Concept Check-In and Remediation

Learning Objective

 Students will work to correct misconceptions and errors related to finding must ples of whole numbers

Student Learning Target

 I can correct my misconceptions and errors related to finding multiples of whole numbers

Unit 6 Factors and Multiples

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Factors and Multiples

Alternate Pacing Guides

If Mathematics instruction is based on 45 minutes/5 days a week, do the following:

Reduce ACCESS by 3 minutes

Reduce Bu D by 8 minutes

Reduce CONNECT by 2 minutes

Reduce WRAP & P by 2 minutes

Strategies for reducing time in each section:

- Discuss fewer examples
- · Eliminate Shou der Partner conversations
- Shortenic assidiscussions
- Work with students to complete ACCESS problems

If Mathematics instruction is based on a combination of 45 minutes/4 days a week and 90 minutes 1 day a week, do the following:

Fo low the 45-minute approach for the 45-minute days

Teach two 454m nute tessons on the 904minute day

If Mathematics instruction is based on 90 minutes/5 days a week, do the following:

increase ACCESS by 5 minutes

increase Bu . D by 20 minutes

Increase CONNECT by 3 minutes

ncrease WRAP-UP by 2 minutes

Strategies for increasing time in each section:

- Discuss additional examples as needed.
- Extend class discussions
- · A switting for hands-on work with man brightness and modes
- Pravide additional practice problems for students who need additional practice
- Encourage students to share and model their problem-solving strategies

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Mathematical Background Knowledge

Understanding Factors and Multiples

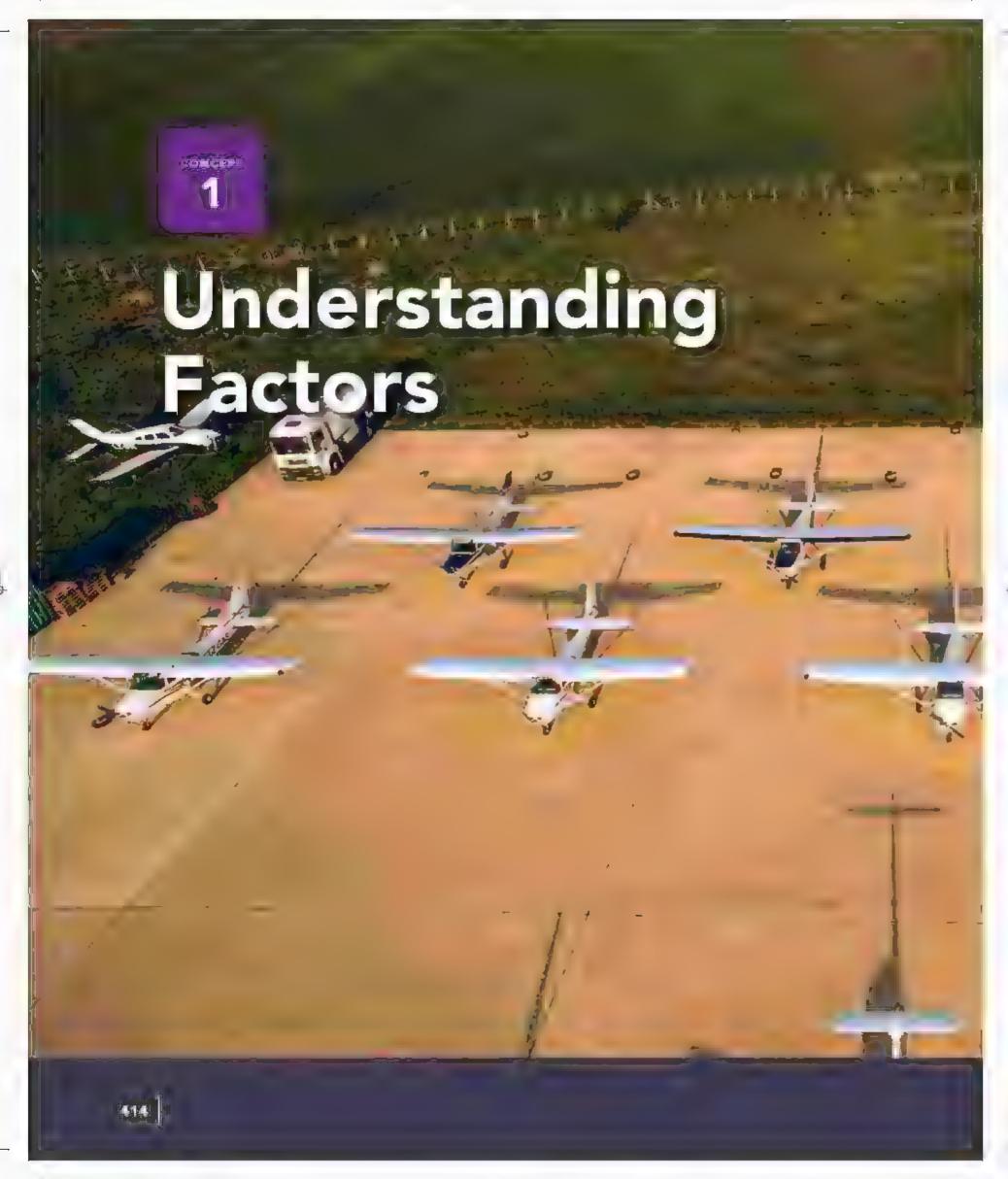
n Primary 3, sugents worked to commit at thurspication facts to memory and used the relationship between multiplication and division to solve problems. In Primary 4, students use that now edge to find the factors of a number Students use a hundreds chart to determine patterns for numbers that have factors of 2, 5, or 10 and develop an understanding that factors come impairs. Students review the dentity Property of Multiplication and recall that one factor pair for every number is 1 and the number itself. Students are introduced to a factor raint on and a Lichart as two factores to help them keep track of the factors of a number. In a work builds the foundation for student's work with division litter in Primary 4, where students divide with remainders and work on divising larger numbers.

Students use their unpwiedge of multiplication facts and patterns they centified when skip counting by 2, 5, and 10 in the previous lesson to discover patterns for numbers that have factors of 3, 5, or 9. Armed with the kind who edge of these spick times for determining if a manner has a factor of 2, 3, 5, 6, 9 or 10 students how have the ability to explore prime and composite numbers. Students extend their understanding of factors to find common factors and the greatest common factor of two numbers. These sins provide additional practice with math facts in preparation for multiplication and vivis or in any for understanding equivalent fraction equivalent fraction equivalent factor of edge oping an inderstanding of fraction equivalence.

Hur dreds clients seem about multiples of a number lift the end of the unit, students explore the relationship between factors and multiples it is important for students to be familiar with finding multiples of a number when they begin multiples division later in Primary 4. Dentifying multiples as a so provides an additional apportunity to practice multiples are not facts prior to unit? Students extend their understanding of multiples as they work to dentify common multiples. This is important as students begin to explore fractional relationships after in Primary 4. This is also in portant as students advance to Primary 5 where they continue to identify common multiples of numbers, in reality common multiples are used to solve problems about frequency, amounts, and other everyday occurrences.

Lest as multiplication and division are related operations, there is a similar relationship between factors and multiplies. When factors are multiplied, the product is a multiple of the factors, in later units in Primary 4, students use factors and multiplies as they work on multiplied, that placetion and division understanding the relationship between factors and multiplies will keep students be more fluent with multiplication and division strategies such as area models, partial products, and standard algorithms. In Primary 5, students by a automaticity in fluency factors and multiplies of numbers.

Unit 6 Factors and Multiples





Concept Overview

In Concept 1: "Inderstanding Factors, students explore the concept of factors. They use their knowledge of multiplication facts, observation of patterns in skip counting, and number sense to build critical understanding of the relationship between numbers and their factors. They identify factors informations, and greatest common factors between two numbers. This work prepares them for working with larger numbers and fractions.

Concept Standards

4.C.2 Gain familiarity with factors and multiples

4.C.2.a.i Find a factor pais for a whole number in the range 1-100

4.C.2.c Indithe greatest common factor between two whole numbers

Concept 1 Understanding Factors

Concept Planner

All lessons are designed to be 60 minutes. The materials isted in this chart are items to gather for each group. Items for the class or for individual students are and rated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
I dentifying Factors of Whole Numbers	24 t les (1 set per student) (Photocopythelesson 1 24 T les Backing Master at the end of this volume.) Hundreds chart (1 per student) (Photocopy the lesson 1 Hundreds Chart Black ine Master at the end of this volume.) Crayons	Factor pairs	Students will define factors of a whole number of a given number between 0 and 100 Students will explain patterns they observe in numbers.
2 Prime and Composite Numbers	No additional materials needed	Composite Factors	that have 2, 5, or 10 as factors • Students will find all Eactors of a given number between 0 and 1,00
			 Students Witterplain patterns they observe in numbers that raye 3, 6, or 9 as factors
			Students will determine if a number is prime or composite

110



Common Misconceptions and Errors

Opportunities for Formative Assessment

Students may only list some of the factors of a number. For
example, bey may forget to include 1 and the number itself
on only include one number in a factor pair.

Finding Factor Pairs, Writing About Math, Practice Check Your Understanding

- Students may be ever that a lever numbers are composite numbers, however, 2 is prime because its only factors are fl and itself.
- Students may have difficulty tilent fying a number as a factor
 of another number if there is no pattern for that number. For
 example, 4 is a factor of 24 but there is no pattern for 4 as a
 factor.

Prime or Composite. Writing About Meth. Practice, Check Your Understanding

Concept 1 Understanding Factors

	- ole
-	- (1)
	- Ar

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
Greatest Common Factor	Math Filency Spirit (2 per student) (Photocopy the Blackline Master at the and of this volume)	Common factor Factor Greatest common factor (GCF)	 Students will fund common factors between two windle numbers Students will dentify the greatest common factor between two with eighthers
Concept Check in and Remed at or	Mater.as may vary	Review concept vocabulary as needed	Students will work to correct misconceptions and errors te ated to identifying factors of who e numbers

Opportunities for Assessment:

in addition to the assessment apportunities included in this chart; each concept will niclude a Concept Check-in

Common Misconceptions and Errors

 Once students identify one common factor, they may have difficulty finding auditional common factors, including the greatest common factor

- Students may only at some of the factors of a number for example, they may not no ude 1 and the number itself or only include one number in a factor pair.
- · Students may be leve that all even numbers are composite numbers. However, 2 is prime because its only factors are 1 and fiself
- Students may have difficulty identifying a number as a factor. of another number if there is no pattern for that number. For example, 1 signature of 24 but there is no pattern for 4 as a faistor
- · Once students identify one common factor, they may have a frouty finding additions common factors, including the glicatest correspondentor



Opportunities for Formative Assessment

Common Factors, Finding the Greatest Common Factor, Writing About Math, Practice Chericitour Understanding

Concept 1 Understanding Factors

Understanding Factors

LESSON 1 Identifying Factors of Whole **Numbers**

Lesson Overview

mittus ressori, students define factors and practice finding factors of a mumber. They use relationships between numbers and known multiplication facts to cetermine whether 2, 5, and 10 are factors of argiveni mumaber.

Lesson Essential Question

 What is the relationship between a number and its factors?

Learning Objectives

In this lesson

- Students will define factors of a whole number
- Students will find a lifectors of a given number between 0 and 100
- Students will explain patterns they observe in numbers that have 2, 5 or 10 as factors

Grade-Lavel Standards

4.C.2 Gain familiarity with factors and multiples

4.C.2.a.i Find at factor pairs for a whole number in the range 1—100



Vocabulary Check-in

factor factor pairs



Materials List

- "Hundreds Chart (1 per studient)
- Crayons.



Preparation

Photograpy the 24 Tries Blacking Master and the Hundreds Chart Blacking Master at the end of the volume

DIGITAL



Identifying Factors of Whole Numbers



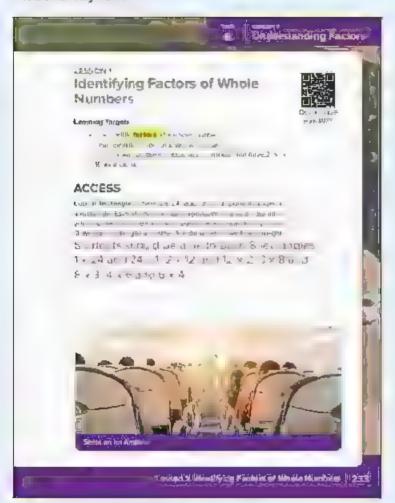
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Student Page 233



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

 Students thay only istispine of the factors of a mumber. For example, they may forget to include I and the number fixed or only include one number in a factor pair

Lots of Rectangles

- 1 Provide students with 24 tiles and ask then to turn to Lesson 1 ACCESS Lots of Rectangles
- 2. Ask students to use a 24 tiles to create as many rectangles as they can. For each rectangle they create they should draw a picture in their Student Edition and about the dimensions.
- 3 After a few minutes, as instructor to share their drawings with a partner
- Ask, volunteers to shape draw their rectangles on the board and laber their measures. Be sure to ask for students who have different responses from those already shared.

Answer Key for Lots of Rectangles:

Students should be able to build 8 rectangles

- . a and 74 1
- * 1 die . *
- X 15 ... 5 × 3
- 1 × 4" 11 × 4

Lesson 1 - Identifying Factors of Whole Numbers



6 Understanding Factors

BUILD (40 min)



Numbers with Factors of 2, 5, and 10 (20 mm)

- 1. Explain to students that they are going to learn about factors today. Attaching hit is a new term, they have a ready slope some work with factors. Refer students to the work on the board and explain that they have sted the factors of 24. Factors are numbers that can be multiplied to form any veniproduct.
- 2. Ask students to use the drawings on the board to dentify the factors of 24. As students, dentify factor parts, record them in a factor tree as shown.

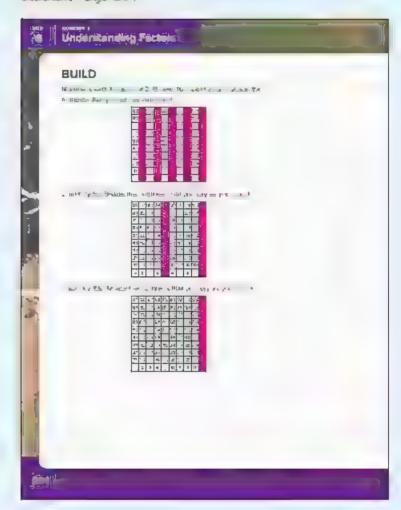


- Ask students to share what they notice about the factor tree (Students may notice that the numbers are written in chaer, that each number has a line in the "Tree" and their some of the numbers are factors of the other numbers.
- 4. The students they we are investigating factors for other numbers. Ask students to turn to lesson 1. Build humbers with Factors 2.5, and 10.
- 5 Ask students to pay at the first mundreds chart and skip count aloud with you by 2s to 40. Direct students to quickly shade in the boxes for the numbers they say aloud
- 6 Ask students formake predictions about the remaining numbers that will be shaded when counting by 2 Students may not be patterns sheding and international all of the numbers and even
- 7. Repeat the proceedure counting by 5s to 55 and then 10s to 100. Each firms, ask students to make predictions about the remaining numbers that would be shaded if they continued collating.

 Students may notice patterns all of the shall incomplete and in 5 of J when counting I. I. C. a. the shaded numbers and in 0 when counting I. I. C. a. the shaded numbers and in 0 when counting I. I. C. a. the shaded numbers and in 0 when counting I. I. C. a. the shaded numbers and in 0 when counting I. I. C. a. the shaded numbers and in 0 when counting I. I. C. a. the shaded numbers and in 0 when counting I. I. C. a. the shaded numbers and in 0 when counting I. I. C. a. the shaded numbers are the counting I. I. C. a. the shaded numbers are the counting I. I. C. a. the shaded numbers are the counting I. I. C. a. the shaded numbers are the counting I. I. C. a. the shaded numbers are the counting I. I. C. a. the shaded numbers are the counting I. I. C. a. the shaded numbers are the counting I. I. C. a. the counting I. I.

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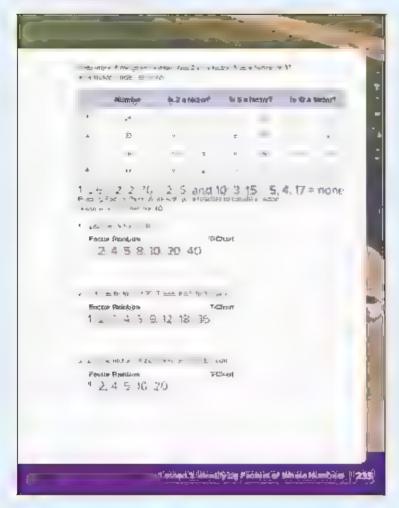
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- 8. Explain to students that understanding number patients can help them identify factors. For example, when we skip counted by 2s, we shaded only even numbers. That ters us that 2 is a factor of all even numbers.
- Ask students to discuss what the patterns for 5 and 10 review apout factors for the shaded numbers for 5 and 10 review as 1, 100 great 1 great
- 10 Direct students to Problem § Ask students to use what they know to determine if Zo has 2, 5, and/or 10 as a factor Discuss the answers together
- 11 Asi students to solve Problems 2 4, and then discuss the answers together

Answer Key for Numbers with Factors of 2, 5, and 10:

- m 1 f + porm

Finding Factor Pairs





- Direct students to Lesson 1 B.J. D. Finding Factor Pairs
- 2 Explain to students there are different ways to ist factors. In addition to the factor tree (which they saw with 24), they can also create factor rail pows or factor Ficharts.
- Mode how to deste a factor reinbow for 24 (as shown)



- 4: Model for students finding factors of 40 using factor pairs and creating a factor rainbow. Students should record the factors in their Student Edit on: A suggested process follows.
 - . Start with the factor pair 1 and 40
 - o Explain that because of the departy Property of Multiplication any number times 1 is equal to the number Every number will have a factor pair of 1 and itself.
 - Next, identify 2 as a factor because 40 is even. Whose finding the factor pair with 2. Since 2 × 20 is 40, 2 and 20 are the factor pair.
 - · Continue identifying a lof the factors of 40
 - o Mode the thinking process of using known facts and factor falles for 5 and 10, discovered earlier
 - o Demonstrate trying out numbers in order to not miss any factors in the process For example, thin will there is a number that can multiplied by 3 to make 40 Since this is not possible, 3 shoot a factor of 40



Show students how to create a Tchart using the factors of 40.



- 6. For not out to students that since there is no factor pair for 40 with 6 or 7, they have found a the factor pairs because 8 is already listed. At this point, the factors will begin to repeat.
- 6. Ask students to work with a partner to complete Problems 2 and 3. With about 5 minutes left in Buil. D. ask students to share their answers.

Answer Key for Finding Factor Pairs:

1, 1, 2 4, 5, 8 10, 20, 40

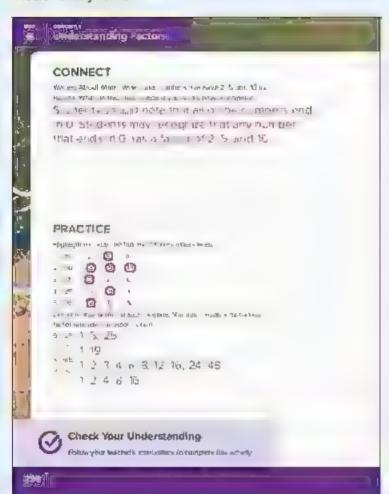
. . 4 6 9, 12, 18, 36

. 1 . 1 = 10 9



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CONNECT (7 min)



Writing About Math

Direct students to "esson 1 CONNECT Writing, About Math and as them to respond to the journa, prompt

WRAP-UP (3 min)

Let's Chat About Our Learning

- 1 Ask volunteers to share the numbers they isted in their Writing About Math response along with their reasoning.
- Distuss with the case what a loftine numbers have roomings
 tourness the literary trate of the numbers have an O. Students in a ner great at the number of the contract of the

Lasson 1 - Identifying Factors of Whole Numbers



PRACTICE

Direct students to Lesson 1 PRACTICE and have them complete the problems Address student errors and misconceptions around finding factors.

Check Your Understanding

List all of the factors of each number. You may create a factor tree factor rainbow, or factor Tichart

- 1 54 1, 2 3, 6, 9, 18 27, 54
- 2 _1 1 _ 4 7 14 28
- 3 Is 3 a factor of 39? Show your work and explain your reasoning. The example reasoning. The example reasoning. The example reasoning is a not a part of the list or no, because there is no number times of that edges. 279
- 4. Is 4.5 a factor of 5° Show your work and explain your reasoning.

 1. 45 is not a factor of 8. Sample 1: asoning. There is no whole number it can include, by 45 that will edge 5 or 45 is not a factor of 45.





Materials List

No additional materials needed



Preparation

No preparation reeded

DIGITAL



Prime and Composite
Numbers



egitti4076

LESSON 2 Prime and Composite Numbers

Lesson Overview

In this lesson, students use relationships between pulmbers and known inches cation facts to determine whether 3, 6, and 9 are factors of a number. Students also learn to categorize a number as prime or composite.

Lesson Essential Question

 What is the relationship between a number and its factors?

Learning Objectives

In this lesson

- Sturterts will find all factors of a given number between 0 and 100
- Students will explain patterns they observe in numbers that have 3, 6, or 9 as factors
- Students will determine flair umber is prime or complexite.

Grade-Level Standards

4.C.2 Gam familiarity with factors and multiples.

4.C.2.a.i And all factor pars for a whole number in the range 1-100



Vocabulary Check-In

composite, factors, prime

Leason 2 - Prime and Composite Numbers



6 Understanding Factors

ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may be even that an even rumbers are complete numbers, However, 2 is prime because its only factors are 1 and itself.
- Students may have difficulty dentifying a number as a factor of another number if there is no pattern for that number for example, 4 is a factor of 24 but there and pattern for 4 as a factor.

Factor Riddles

- 1 Direct students to Lesson 2 ACCESS Factor Riddles
- 2. Read the ridgles aloud to students and ask them to try to solve the ridgles and record their answers
 - Lam an even mumber between 20 and 30 Some of my factors include 1, 2, 4, 7, and 14 What number am ?
 - I am a number greater than 40 I have a factor of 10 I am less than 60. What number am I?
 - am a two-digit number—have 5 as a factor My Tension; tis essthan my Ones digit. One of my factor pairs a 5 and 7. What number am?
- 3 Ask students to briefly share their strategies for solving the riddies

Answer Key for Factor Riddles:

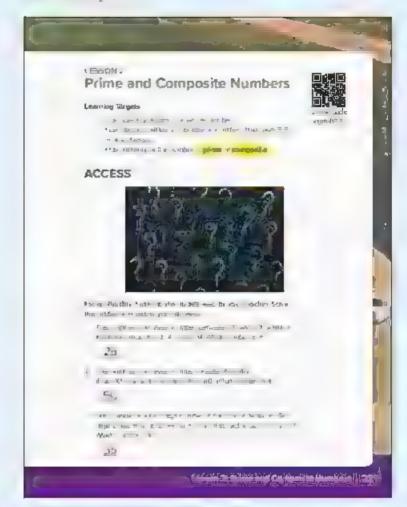
1 3

Z 5!)

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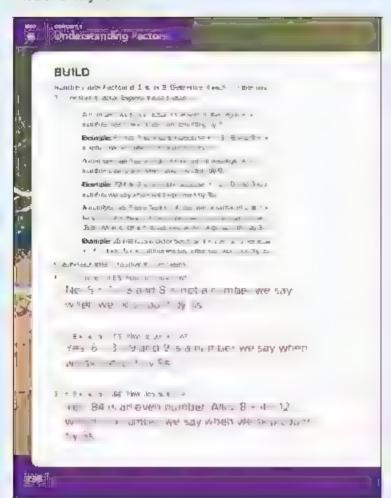
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BUILD (40 min)



Numbers with Factors of 3, 6,

or 9 (15 mind

- 1 Asir students to recall how they know a number has a factor of 2, 5, or 10 if necessary, remind students of the patterns they ripserved.
- 2 Share that there are also patterns for numbers that have factors of 3-6, by 9 Direct students to pesson 2-8. Distributes with Factors of 3, 6, or 9
- 3 Write the patterns on the board for students to refer to while working
 - A number has 3 as a factor if the sum of the rights s a number that is said when six picounting by 3
 - D Example 3 is a factor of 63 because 6 ± 3 = 9 and 9 is a number said when six p counting by 3s.
 - or Non-example 3 is not a factor of \$1 because 7 + 1 - 8 and 8 is not a number said when sup counting by 3s
 - Anumber has 9 as a factor if the sum of the dig is a number said when skip edunting by 9s
 - Example 9 is a factor of 72 because 7 + 2 = 9
 alto 9 is a number said when slip counting by 9s
 - Non example to is not a factor of 95 because
 9 + 5 = 14 and 14 s not a flumber said when suit counting by 9s
 - A number has 8 as a factor if thas a factor of 2 and a factor of 3. This means it has to be even and the sum of the did is have to be a number said When skip counting by 3s.
 - o Example 6 is a factor of 72 pecause it is even and 7 + 2 = 9 vm chi s a number said when six produnting by 3s
 - o Non example in single factor of 57 because it is not even in a solution of 32 because 3 + 2 = 5, which is not a number said when skip counting by 3s.
- A Ask students to apply these patients to solve Proplems 1.3 in their Student Edition. After a few minutes, discuss the answers tegether.

Answer Key for Numbers with Factors of 3, 6, or 9:

- 1 No fire 3 and 8 is not a number we say when we say is a minute of the say is say in the say in the say is say in the sa
- I is a 4.3 = 9 and 9 is a number we say when is
- re- hill is an even number Also B # 4 12, which it a number we say when we stip count by in

Laszon 2 - Prime and Composite Numbers



6 Understanding Factors

Prime or Composite (10 mm)

- I Remind students that numbers can be categorized as even or odd. Then, explain to students that numbers can also be categorized as prime or composite depending on their factors.
- 2 Direct students to Lesson 2 BUILD firme or Composite. Define prime numbers (numbers with exactly two factors—1 and itself) and composite numbers (numbers with more than 2 factors)
- 3 Connect prime and composite to previous rectangle activity. As a students to think about how many rectangles can be formed for prime humbers (just 1) and now many rectangles can be built for composite numbers. It is a vin 1.
 - TE REPORTE O and the new prime imposed multiplems, as they do not fit entire terms.
- 4 Complete Problem 1 with students. Answer any questions students have about prime and composite in impers. As a students to work with a partner to complete Problems 2.5. After a few minutes, go over the answers together.

Answer Key for Prime or Composite:

1 16 1 3 7 8 7 18 % m reste

1 4 1 3 From 8

4 44 1 4 1 1 1 44 mpmme

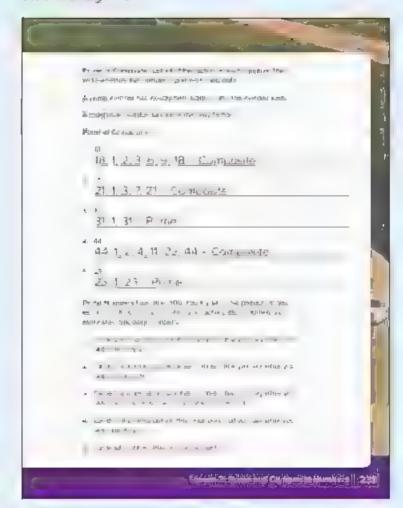
5 3 21 from 8

Prime Numbers Less than 100 (15 mm)

- Assign students to groups of 4
- 2. Direct students to Lesson 2 Bu LD Frame Numbers Less than 100 Go over the directions and assistudents to work with their group to find prime numbers.

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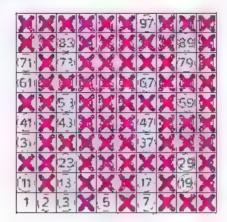








Answer Key for Prime Numbers Less than 100:



Leason 2 - Prime and Composite Numbers

CONCEPT **Understanding Factors**

CONNECT (7 min)



Writing About Math

Ask students to turn to lesson 2 CONNECT Writing About Math to respond to the prompt

WRAP-UP (3 min)



(E) Let's Chat About Our Learning

Ask students to discuss their Will this About Matin response with a partner and then with the class Stratenite at pand matace that 48 is in Lingth and 53 is Edition Even this agrice to wave more reats then. My A may arange to test a a ramance for Johnst bear 1 in part tower a reat-Lengths may can safe by altanged in a square while A countries deal for a ferry (this part of the leg or le hay be subject to personal expensional

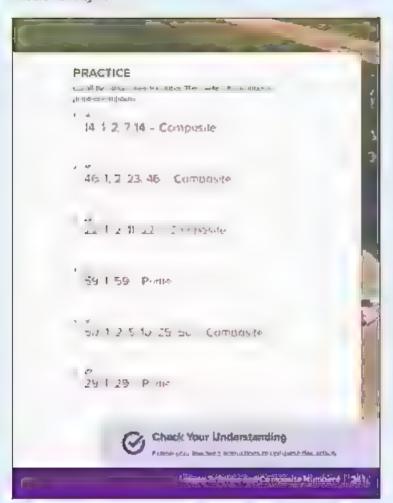
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Student Page 241



PRACTICE



Direct students to Lesson 2 PRACTICE and have them complete the problems. Address student errors and misconceptions

Check Your Understanding

nist a the factors of each number Then, write if the number is prime or composite

- 1 17 1, 17 Romae
- 2 12 1 3. 4. 6. 12 Composite
- 3 2 1 2 France
- 4. 33 ft. 3, 11, 33 -- Composite
- 5. 51 1. 3. 17. 51 Composite
- 6. 37: 1. 37 Printle

Understanding Factors

LESSON 3 **Greatest Common Factor**

Lesson Overview

in this essen, students build on their understanding of factors to find the common factors of two numbers Students then work to find the streatest common factor of two nambers

Lesson Essential Question

What a the reationship between a number and its

Learning Objectives

in this lesson

- Students will find common factors detween two whole numbers
- Students will identify the greatest common factor between two whole numbers

Grade-Level Standards

4.C.2 Gain fam arity with factors and multiples

4.C.2.a.i Find a factor pairs for a whole number in the ange 1 100

4.C.2.c And the areatest common factor between two who enumbers



Vocabulary Check-In

common factor, factor, greatest common factor (GCF)



Materials List

Wath Fluency Sount (2 per student)



Preparation

"Priotecopy the Jesson 3 Many Fluency Sprint (found at the end of this volume)

DIGITAL



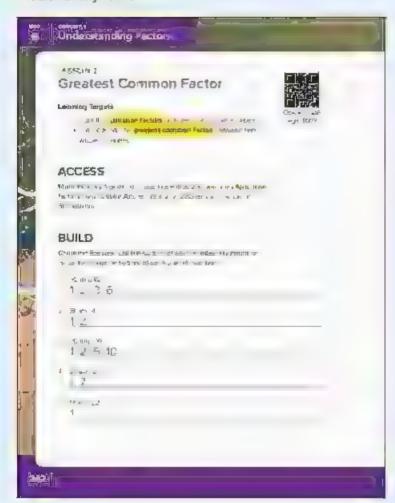
Greatest Common Factor



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Student Page 242



ACCESS (10 min)





COMMON MISCONCEPTIONS AND ERRORS

Once students dentity one common factor, they
may have difficulty finding additional common
factors, including the greatest common factor.

Math Fluency Sprint

- 1. Distribute a Math Fluency Sprint to each student
- 2 On your start, provide students with objected to complete as many problems as possible
- 3 Read the answers to students and have their check their work (Consider having students swap papers and check each other's work) Students should count now many problems they do correct and record their score at the top of the page
- 4. Lead strucents in 30 seconds of too tournes while skip counting by 7s
- 5 Give each student another Math Fluency Spirint Tell students the rigidal is to try to answer more problems correctly than on the previous spirint
- 6 On your start, provide students with 60 seconds to complete as many problems as possible.
- 7 Read answers to students and de ebrate any student improvement

BUILD (40 min)



Common Factors (20 min)

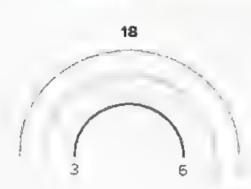
- Remind students that they have been working to find factors of numbers. Explain that foday they will work to find factors that two numbers have in common.
- 2 Made finding all of the common factors of 18 and 24 as to ows
 - Find as the factors of 18 Then list out the factors of 18 from least to greatest

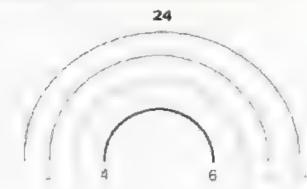
Lesson 3 - Greatest Common Factor



6 Understanding Factors

- . Find a the factors of 24. Then list out the factors of 24 from least to greatest
- · Circle all of the factors that are in both lists. These are the common factors





18: <u>1</u>, <u>2</u>, <u>3</u>, <u>6</u>, 9, 18 24: <u>1</u>, <u>2</u>, <u>3</u>, 4, <u>6</u>, 12, 24 Common Factors: 1, 2, 3, 6

3. Ask students to share their thoughts on the following questions with a partner

titue attret a write 1 limba 34 whiere II is a feator of 24

- Do all parts of numbers have common factors?

 Here we are a recorded and the first have at the end of the time.
- What do you think would happer if one of the numbers you are finding common factors for slaph menumber?
 The wood in your entropy.
- 4. Ask students to turn to Lesson 3 B....D Common Factors. Ask students to work with a partner to complete Problems 1–5. As students work, wax around, and monitor their prodicess. Offer support to students who are strugging. If many students are strugging, consider having students work in pairs or small groups.
- 6. When students are finished, ask students to discuss their thoughts on the following questions with a partner.
 - Do all pairs of numbers have common factors?

 All numbers ut are a factor of 1, but may not have any other common factors.
 - What do you think would happen if one of the numbers you are finding common factors for is a prime number?

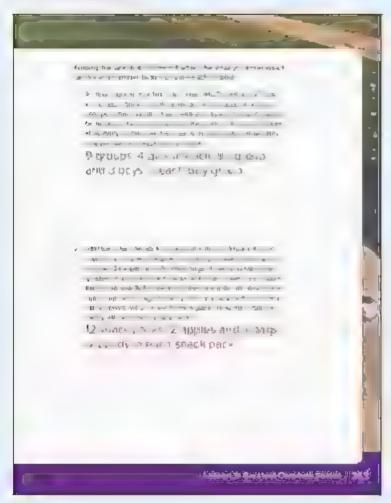
They would do you at the all common factor unless one of the numbers with the true tyle of the district of the factor of the fac

Answer Key for Common Factors:

1-1-30 1 _ 37 1-1-30 4 1. 2 1-1-30 1 _ 1 1: 1-1-30 1 _ 1 1: 1-1-30 1 _ 1 1: 1-1-30 1 _ 1 1:



Student Page 243



Finding the Greatest Common Factor

- 1 Direct students to Lesson 3 by LD Finding the Greatest Cummon Factor
- 7 Read Problem 1 with students. Model your thinking of this problem as to lows.
 - Explain what you know about the problem.
 - o Only will be divided into groups. Boys will be divided into groups. The groups must be the same size.
 - · Explain what you are trying to find out
 - o need to figure out how many groups the seacher can make an together. Then inteed to know from many gins will be in each girl group and how many boys will be in each boy group.
 - Explain that you know that it would be possible to make 3 groups because 3 is a common factor of 36 and 27. The gur groups would have 12 gifts and the boy groups would have 9 poys
 - Reject the problem emphas and that it asks for the greatest number of groups that can be made 3 is not the greatest number of groups that can be made.
 - Let the factors of 36 and 27 on the board and
 ask students to identify the greatest common
 factor (or GCF) of the numbers. Since the GCF
 is 9, that means the greatest number of groups
 that can be made is 9 with 4 girs in each gir
 droup and 3 boys in each boy group.

Lesson 3 - Greatest Common Factor

6 Understanding Factors

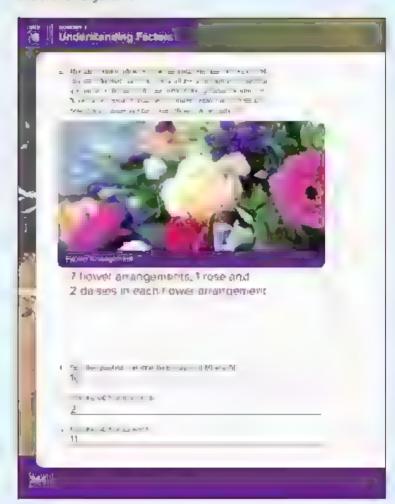
3. Assign students into groups of 4 to work on the remaining problems. As students work, walk around; and monitor their progress. Offer support to students who are struggling, financy students are struggling, consider doing another example on the board.

Answer Key for Finding the Greatest Common Factor:

var ps A , a rear a toughter and tour

- ൂ ി ട്രണ്ട് പ്രധാനം വെയുന്നു പ്രധാനം നിയുന്നു. ഇത്രെന്നു വിത്ര
- I flower arrangements Trose and 2 dats as in each flower arrangement.
- 4 10
- E _3
- A 11

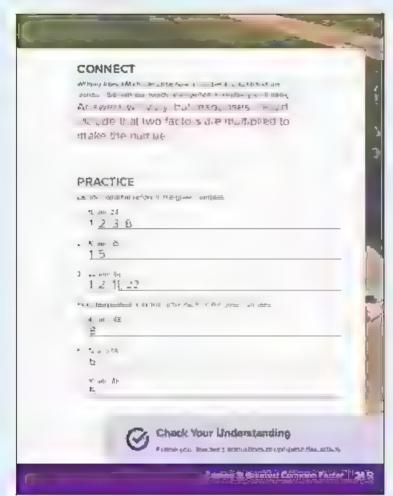
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Student Page 245



CONNECT (7 min)



Writing About Math

Ask students to tamito Lesson 3 CONNECT Writing About Math to respond to the prompt

WRAP-UP (3 min)



(P) Let's Chat About Our Learning

As students to share their Writing Apout Math response with a partner. Them, ask stationts to share with the class

Assivers will vally, but responses should include that to factors are multiplied to make un there

PRACTICE

Direct students to lesson 3 PRACTICE and have them complete the problems. Address student errors and misconceptions

Check Your Understanding

Find the greatest common factor (GCF) of the given numbers

- 1. 35 and 84 12
- 2. 20 and 40 20
- 3 45 and 81 9
- 4 45 and 60 15
- 5. 20 and 35.5
- 6. 24 and 38 12

Understanding Factors

Concept Check-In and Remediation

Lesson Overview

anithis lesson, students wonly to correct misconceptions and errors from Concept 1 Understanding Pactors First, administer the Concept Check-in Once you have reviewed the quiz results choose remed allong activities based on the needs of your students. Some recommendations are isted below, but the needs of your particular students should inform your chicides Students may work independently, in pairs, or in a small group with the teacher

Lesson Essential Question

 What is the relationship between a number and its factors?

Learning Objective

in this lesson

 Students will work to correct misconceptions. and errors related to identifying factors of whole murnbers

Grade-Level Standards

- 4.C.2 @an fam lanty with factors and multiples
- 4.C.2.a.i Find a factor pairs for a whole number in the range 1-100.
- 4.C.2.c Find the greatest common factor between two whose numbers



Vocabulary Check-in

Review concept vocabulary as needed



Materials List

Materials may vary



Preparation

Preparation may vary

DIGITAL



Concept Check-In and Remediation



egimi#078

440



COMMON MISCONCEPTIONS AND ERRORS

- Students may only list some of the factors of a number. For example, they may not include I and the number usefflor only include one number in a factor pair
- Students nitro believe that all even muribers are composite numbers. However, 2 is prime because its only factors are 1 and itself
- Students may have difficulty identifying a number as a factor of another number if there is no petient for that number. For example, 4 its factor of 24 but there is no pattern for 4 as a factor.
- Once students identify one common factor, they may have difficulty finding additional. common factors, including the greatest common factor-

Concept Check-in and Remediation | 447

Remediation: Correcting Misconceptions

If. . .

Students struggle to find all of the factors of a number

Then. . .

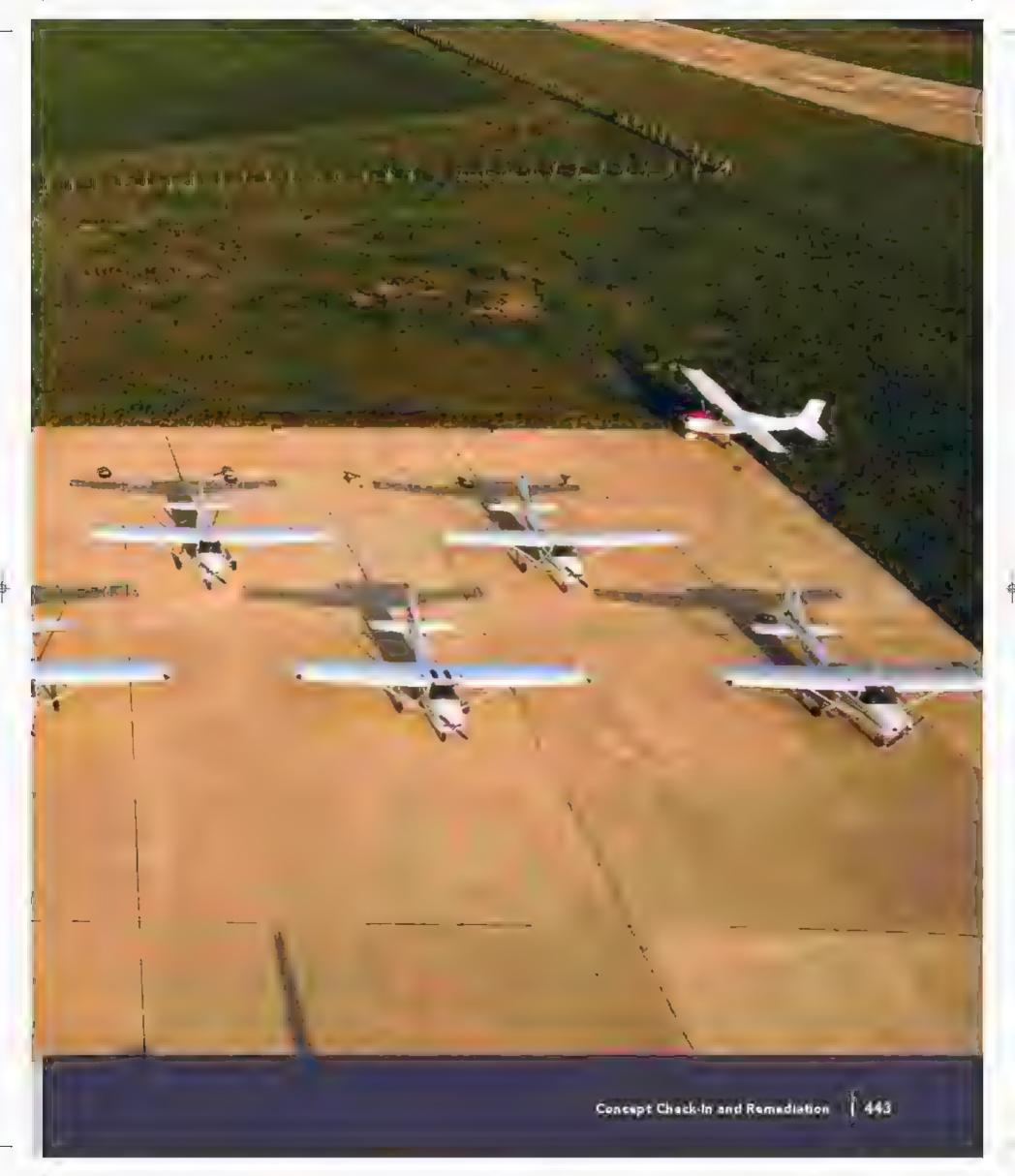
Review the patterns in Lessons 1 and 2. Make sure that students con in the constitution of the methods—the factor rainbow method or the T-chart method to systematically keep track of factor pairs starting with 1 and the rightber and them moving to 2 and then a 2 and so on A so, spend time helping students to figure out when the factors begin to repeat so that they know they have found them all Additionally, remind students that multiplication facts can be pit emiliar tify factors of a given rumber.

If. . . .

Students have difficulty finding a common factor or the greatest common factor

Then. . .

Review Lesson 3. Corsider having students engage it a hands on activity where they practice dividing objects. Into groups. Assign each student or group of students a different number of objects and ask whether it is present to make 7 groups out of the number 3 groups and so on Numbers that can be divided into the same number of gloups share that flumber as a common factor.







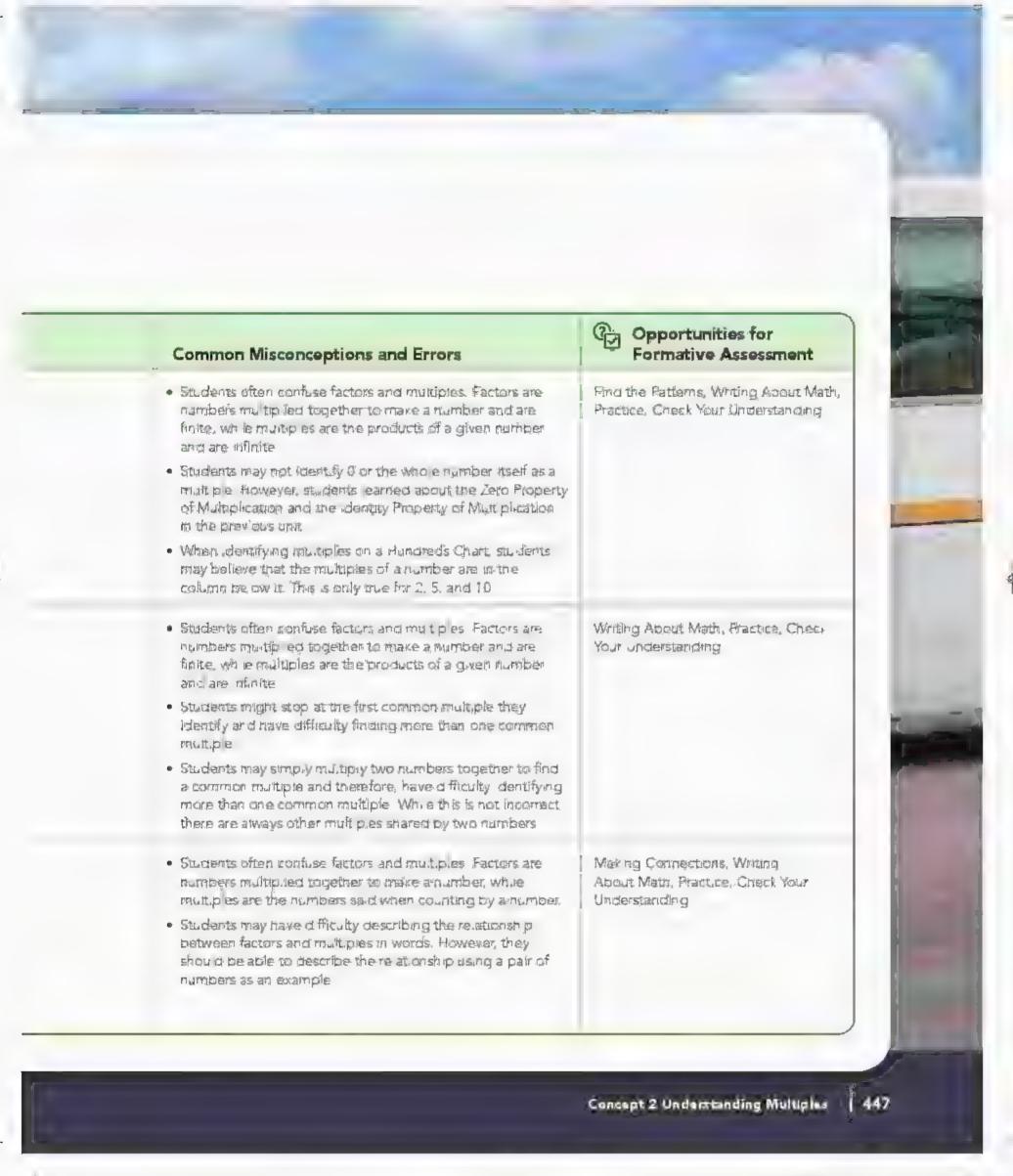


Concept Planner

All lessons are designed to be 60 minutes. The materials fixted in this chart are items to gather for each group. Items for the class or for individual students are indicated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
4 Identifying M. Tp.es of Whole Numbers	Large standards Chart (1 for the teacher) (Photocopy the Lesson 5: Teacher Hundreds Chart or use it to create a transparency for an oyethead projector.) Hundreds Charts for Multiples (1 per student) (Photocopy the Lesson 5 Hundreds Charts for Multiples Blackline Master)	Multiplies Sup count	Students will define multiples of whole puribers Students will dentify multiples of whole representations.
5 Common Multiples	Wultip e Match B acture Master (1 page per pair of students)	Review Vocably ary as needed	Students wit dentify common multiples between two numbers
6 Relationships between Factors and Multiples	Factors and Multiples Game Cards (I set per pair of students) (Photocopy the Factors and Multiples Game Cards Black me Master at the end of this wourse))	Common multiple Factor Multiples Product	 Stadents will explain the relationship between factors and multiples Stadents will determine if a number is a factor or a multiple of another number.

Spening with



Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
Concept Check-hand Remed at on	* Materia simāy vary	Review concept viicabulary as needed	

Opportunities for Assessment:

maddition to the assessment opportunities included in this chart, each concept will include a Concept Check-In.

Significant of the

- Students often confuse factors and must ples. Factors are numbers multiplied together to make assumber and are finite, while multiples are the products of a given number and are infinite.
- Students might stop at the first common multiple they dentify and have difficulty finding more than one common multiple
- Students may simply multiply two numbers together to find a common multiple and therefore, have difficulty identifying imprestran energommon multiple. While this is not incorrect, there are always other multiples shared by two numbers.
- Students may have afficulty describing the relationship between factors and multiplies in words. However, they should be able to describe the relationship using a pail of numbers as an example.
- Students may not identify 0 or the whole number itself as a
 multiple. However, students rearned about the Zero Property
 of Multiplication and the Identity Property of Multiplication
 in the previous and
- When identifying multiples on a hundreds Chart, students
 may believe that the multiples of a number are in the
 column below it. This is only true for 2, 5, and 10



Opportunities for Formative Assessment

Concept 2 Understanding Multiples

449

6 Understanding Multiples

LESSON 4 Identifying Multiples of Whole Numbers

Lesson Overview

metris lesson, students define a multiple of a whole number. They use srip counting, patterns and known multiples of whole numbers.

Lesson Essential Question

 What's the relationship between a number and its multiples?

Learning Objectives

in this lesson

- Students will define multiples of whore numbers
- Studients will dentify multiples of whore numbers

Grade-Level Standards

4.C.2 Gain farmilianty with factors and multiples



Vocabulary Check-In

multiples, skip count



Materials List

- jarge Mundreds Chart (), for the teachail?
- Thirdred Charts for Munipres
 (1-per student)



Preparation

Photocopy the Lesson Silventher Hundreds Charter use little greate a transparency for an overhead projector.

Palotecopy the Jesson 5 Hundreds Charts for Multiples Blacking Master

DIGITAL



Lesson 4

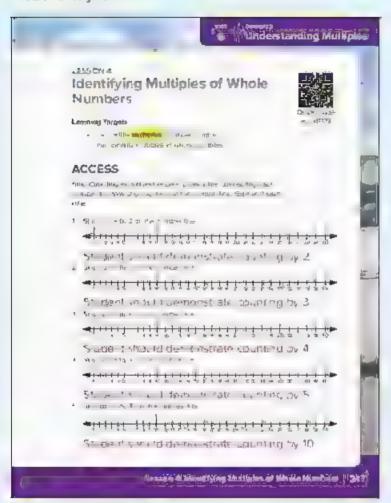
Identifying Multiples of Whole Numbers



CL cr Code egmt4079

450

Student Page 247



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students often confuse factors and multiples.
 Factors are numbers flumpled together to make
 a number and are finde, while multiples are the
 products of agiven number and are minute.
- Students may not identify 0 or the whole number leaders a multiple. However, students learned about the Zero Property of Multiplication and the delitity Property of Multiplication in the previous.
 If it.
- When identifying multiples on a Pundreds Chart, students may believe that the multiples of a number are in the column below it. This is only true for 2, 5, and 10.

Skip Counting on a Number Line

- Direct students to Lesson A-ACCESS 5x ip Counting on a Number Line
- 7 instruct students to skip count appearing number the by drawing a the connecting each number starting with aero.
- 3 After about 7 mmules, ask students to compare their responses with a partner and make corrections, if necessary.

TEANMERIA TE Indusents shound bearn si propries de la material de

Lesson 4 - Identifying Multiples of Whole Numbers

6 Understanding Multiples

BUILD (40 min)

Color the Multiples (25 m.n.)

- Explain that multiples are the products we get when we multiply a quest number. One way we can identify them is by sup counting by the given number. In fact, when students were skip counting by numbers in ACCESS, they were identifying multiples.
- 2 Ask students to turn to tesson 4 Butto Color the Multiples
- 2 Cannect skip counting on a humber line to skip counting on the Hundreds chart. Distribute the Student Hundreds charts to students.
- 4 Go over the directions for the learning activity. Ask students to predict any visual patterns they might find. Ask students to work independently to color as they skip count. As students work, walk around and monitor their progress. Offer support as needed.

tenview at our and multiples that in a lieutine +

we believe at the fig.

"The provider at the fig.

Find the Patterns (15 mm)

- 2 Ask students to look at their hundreds chart with multiples of 2 colored in
- ase Think Pair Share to ask students what they notice about the numbers that are colored in For the Think-Pair Share strategy, provide students time to think about what they notice. Then, students time share their thinking with a pairtie Friary, call on a few students to thate with the class.

 Figure 1 is a notice of the multiples of 2 is a many in the trial them it pies of 2 is a may 2 as a total them. If pies of 2 is a may 2 as a total think that a total substitute that the multiple is a country to the thick at this time to a total total them.

PRINT



Student Page 249



- 4. Pair students together instruct students to write down patterns they notice about the multipres of 3, 4, 5, 6, 7, 8, and 9
- 5. With about 5 minutes off in BuilD, ask students to share the patterns they observed with the class

TEACHER NUTE Statements was make authorized. to the lactor hilles from Lessons 1 and 2. Again, the e three but not releasons at his three Statement for e those connect ons little

CONNECT (7 min)



Writing About Math

Ask students to tumbo Lesson 4 CONNECT Writing About Math and respond to the prompt

WRAP-UP (3 min)



Let's Chat About Our Learning

Can on students to share with the class The bus will stop 4 km, 9 km, 12 km, 16 km, and 20 km from school Sine lives 18 light from the his is of him away from where the lives. The must walk 2 a to letter in either direction to let normal

Lesson 4 - Identifying Multiples of Whole Numbers



6 Understanding Multiples

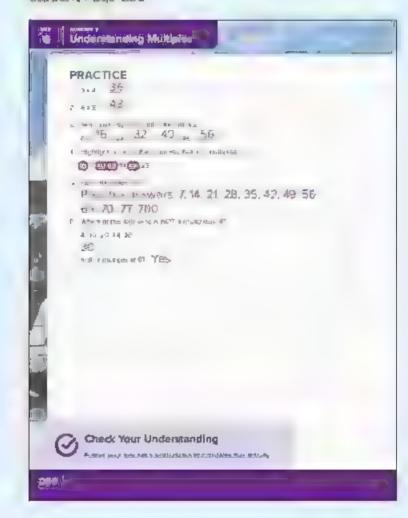
PRACTICE

Direct students to Lesson 4 PRACTICE and have them complete the problems. Address student errors and Intisconceptions

Check Your Understanding

- 1 Write 4 multiples of 6 Prostor articles of 2 18 24, 30 36, 42, 48, 54 cm of 6 0
- 2 Write 4 multiples of 5 P ... a masvers. 5, 10, 15 1' 26 30, 36 40 45 60 55, 60
- 3 Which number is a multiple of 9% 3, 17, 45, 56, 89

PRINT







Materials List

Multiple Water Blackine Waster



Preparation

Phatocopy one page per student of the Blackline Master for Multiple Match

LESSON 5 **Common Multiples**

Lesson Overview

in this lesson, students learn to dentify common multiples of two numbers

Lesson Essential Question

What is the relationship between a number and its multiples?

Learning Objective

In this lesson

Students will dentify common multiples of two numbers

Grade-Level Standards

4.C.2 Gam familiarity with factors and multiples

4.C.2.b Find common multiples between two numbers



Vocabulary Check-In

Review vecabularly as neaded

DIGITAL



Common Multiples



egittt4080

6 Understanding Multiples

ACCESS (10 min)



COMMON MISCONCEPTIONS AND

- Students often confuse factors and multiples.
 Facto s are numbers multiplied together to make a number and are firster white multiplies are the products of a given number and are infinite.
- Student's might stop at the first common multiple they identify and have difficulty finding more than one common multiple
- Students may simply multiply two numbers together to find a common multiple and therefore, have difficulty identifying more than one common multiple. While this sould incomect there are always either multiples thered by two numbers.

The Bus Stops Here

- 1 Ask students to turn to Lesson 5 ACCESS The Bus Stops Here
- 2 institute students to show where each our stops along the number like
- 3 Ask students to discuss what they notice about the buses and where they stop

TRANSE OF THE PROPERTY OF THE

Answer Key for The Bus Stops Here:

From the period of the property of the propert

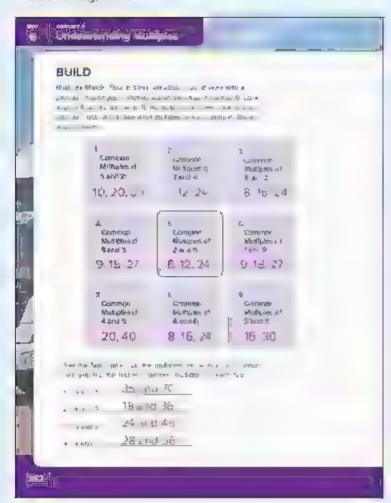


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Student Page 252



BUILD (40 min)





- 1 Assign students to work in parts. Direct students to Lesson 5 Build Multiple Match
- 2 Distribute the Multiple Match Black he Master One partner gets a Partner A set of cards. The other partner gets a Partner Biset of cards.
- Instruct students to lock at Card 1 and write 10 m, tuples of the number on the card (partners have different numbers)
- 4 Instruct students to work with their partner to their record any multiples that are written on both of their cards. These are called common multiples.
- 5. Students repeat those steps with the remaining cards. Make sure both students are looking at their Card 2, Card 3, Card 4, and so on at the same time.
- Go-over the answers together, as ing on partners to share their findings

See the Similarities (1 min)

- 1. Ask students to furnite Lesson 5 Bul LD See the Similarides.
- 2 Instruct students to find the common multiples of each pair of numbers. Encourage students to list the multiples if necessary
- 3 After 8 minutes, have students share their work with a partner
- 4 Lead the cass in a discussion about what they not see when finding the common must pies
 - HE F PERMITTED TO A TRUE OF A STATE OF THE PROPERTY OF SAME THE PERMITTED OF THE PERMITTED

Lesson 5 . Common Multiples

457

CONNECT (7 min)



Writing About Math

Ask students to turn to lesson 5 CONNECT Withing About Math to respond to the prompt A MARK MAD, Lat. Do. 51 Jan 18 - M. Trier of the that in it presides the processines get when they multiply and ambe Matrix and centifically multiplying the very ince or by sign they by the a ven number Students may be as that notify a con-」 「 fe vet time a ight this y did a C free at to free s to the least that

WRAP-UP (3 min)



Let's Chat About Our Learning

Ask volunteers to share their thinking about the journa prompt. Encourage students to ask each other questions as they seek carriy and understanding Writing About Math

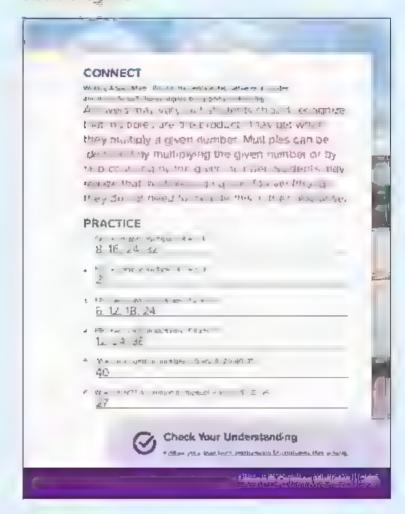
PRACTICE

Direct students to Lesson 5 PRACTICE and have them complete the problems. Address student errors and ក្រាន្តទៅពីខេត្តបន្ទេចក្នុង arisi ត្រឡើញ pertilitying damman ក្រានប្រែប្រែន

Check Your Understanding

- I is 1.6 a common multiple of 8 and 47 How do you KINOW? YES POSSIDE EXCLINA. times 2 is 16 and 4 times 4 is 1c
- 2 Write a common multiple of 3 and 6 f ≪ t ⊢ answers 6, 12, 18, 24, 60
- 3. Which is a common multiple of 6 and 77 ft 14, 36, 42.

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Materials List

Factors and Wuttip es Came Cards (1 set par pair of studeints)



Preparation

Photocopythe Factors and Multiples Garrie Cards Blacking Visites:

DIGITAL





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LESSON 6 Relationships between Factors and Multiples

Lesson Overview

In this essent, students make connections between what they have learned about factors and multiple determine if a given number is a factor or a multiple of another number. This can be che enging for some students, particularly if they confuse factors and multiples. However, this work is crucial, as it he postudents build fluency in multiplication and division and prepares them to work with fractions with unlike the manualous.

Lesson Essential Question

How are multiples and factors related?

Learning Objectives

In this lesson

- Students will explain the relationship between factors and multiples
- Students will determine if a rumber is a factor or a multiple of another number

Grade-Level Standards

4.C.2a Demoi strate understanding that a whole in imper is amultiple of each of its factors



Vocabulary Check-In

commen multiple, factor, multiples, product

Lesson 6 - Relationships between Factors and Multiples

ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students often confuse factors and multiples.
 Factors are rumbers multiplied together to make a number, while multiplies are the numbers said when counting by a number.
- Students may have difficulty describing the
 relationship between factors and multiples in
 words. However, they should be able to describe
 the relationship listing a pair of numbers as an
 example.

Multiples Riddles

- 1. Direct students to sesson 6 ACCESS Multiples
 Ridgles and ask students to solve the ridgles. Advise
 students that there may be more than one answer
- 2 Ask students to share their answers and their reason had for each riddle. Encourage students to ask questions of each other.

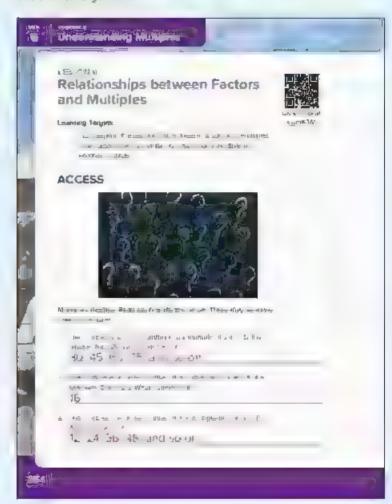
Answer Key for Multiples Riddles:

1 30, 45 40, 75 and so on

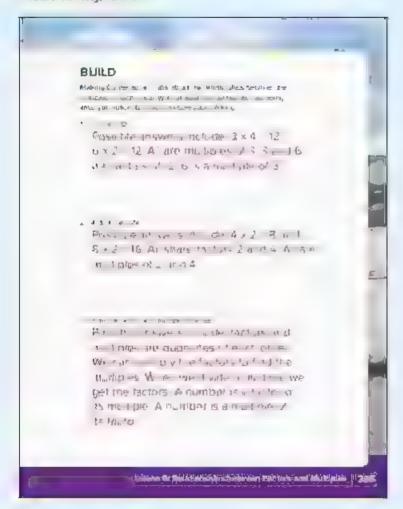
2 16

1 11 14 35 48, and so or

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Student Page 255



BUILD (40 min)



Making Connections (20 m.n)

- 1 Ask students to turn to Lesson 6 BUI_D Making Connect ons Problem 1
- Ask students to write two sentences explaining how the numbers are related. Encourage students to think about factors and multiples.
- 3 Car on students to share out.
- 4. Direct students to complete the remaining propiers
- 5 Asy, students to discuss their answers with a partner
- byte students to share their thinking on how factors and multiples are related with the class

Answer Key for Making Connections:

- 1 Process American see 12 6 v. 12 4 v. 4 fe for 1 fe for
- P swinds were a palk. Pallex 1 10
- s Post a prometer to the control that the property of the control that the control to the contro

Factors and Multiples Game (20 mm)

- 1 Direct students to Lesson 6 BL LD Factors and Multiples Game
- Assign students to partners and distribute one set of Factors and Multiples Game Cards to each pair of students.
- 3. Game play Students place the cards face down in a pile, shuffly tham, and choose one. One partner finds factors of the number and the other partner finds multiples of the number. Students record their answers in their Student Edit on Then, they share their answers with their partners and record their partners answers. If partners disagree, encourage students to help each other understand the ofference between factors and multiples. Students then switch roles, choose applied card, and continue game play.

Lesson 6 - Relationships between Factors and Multiples



CONCEPT 2 **Understanding Multiples**

CONNECT (7 min)



Writing About Math

Ask students to turn to lesson & CONNECT Withman Apout Math and respond to the prompt Fine the rate ingression of the state and malife as a se I all tarr to rat, enteres whe we warm in multiplication flactions we are at a teleficit factors and Titpes of and the state of the example from tate as 1 a ar 14 to enthant for the f म् नामारकः प्रकार्यार्गमान्य हार गाँचा व of the the the transfer of the transfer

WRAP-UP (3 min)

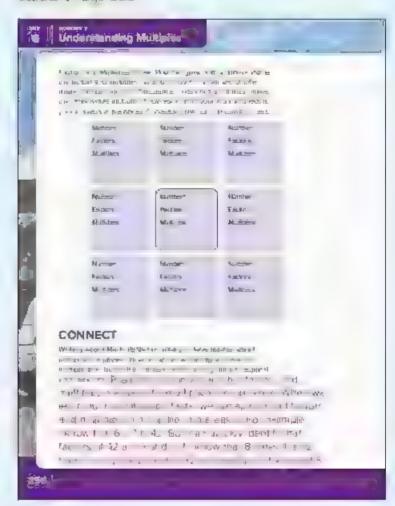


Let's Chat About Our Learning

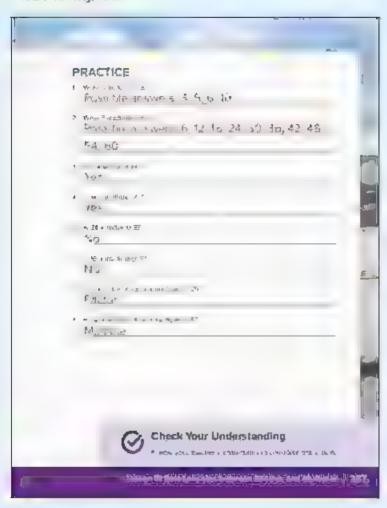
Instruct students to share their responses to the Lesson & CONNECT Writing About Math with a partner

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Student Page 25b



Student Page 257



PRACTICE



Direct students to Lesson 6 PRACTICE and have them complete the problems. Address studentierrors and missengeptions

Check Your Understanding

- 1 Is 7 a factor of 21 or a multiple of 21? Factor
- 2. Write a sentence explaining the relationship petween 6, 4, and 24 use the vacabulary factor and multiple 6 and 4 are factors of 24, 24 diameter e of a 24 is a multiple of 4
- 3. Which of the following are factors of 127.24, 6, 48.
- 4. Which of the fallowing is a multiple of 107 5, 31, 2,

6 Understanding Multiples

Concept Check-In and Remediation

Lesson Overview

inithis lesson, students work to correct misconcept and afters from Concept 2 on derstanding Multiples. First, administer the Concept Check-Init Once you have reviewed the quiz results, thoose remediation activities based on the needs of your students. Some recommendations are listed below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or in a small group with the teacher.

Lesson Essential Questions

- What is the relationship between a number and its multiples?
- How are multiples and factors related?

Learning Objective

in this lesson

 Students will work to correct misconceptions and errors related to finding routiples of whole numbers

Grade-Level Standards

- 4.C.2 dam fam lanty with factors and multiples
- 4.C.2.a Demonstrate incerstanding that a who e number is a multiple of each of its factors
- 4.C.2.b Hnd common multiples between two numbers



Vocabulary Check-in

Review concept vocabulary as needed



Materials List

Materials may vary



Preparation

Preparation valueary

DIGITAL



Concept Check-In and Remediation



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COMMON MISCONCEPTIONS AND ERRORS

- Students often confuse factors and multiples. Factors are numbers multiplied together
 to make a number and are finite, white faultiples are the products of a given number
 and are infinite.
- Students might stop at the first common multiple they identify and have difficulty finding more than one common multiple.
- Students may simply multiply two numbers legather to find a common multiple and therefore, have difficulty dentifying more than one common multiple. While this is not morroof, there are always other multiples shared by two numbers.
- Students may have difficultly describing the relationship between factors and multiples
 in words into wever, they should be able to describe the relationship using a pair of
 numbers as an example.
- Students may not identify 0 or the whole number itself as a multiple: However,
 students remaded about the Jero Broberty of Multiplication and the Identify Property of Multiplication in the previous unit
- When identifying multiples on a Hundreds chart, students may believe that the
 multiples of a number are in the column below it. This is only true for 2. 5, and 10

Concept Check-In and Remediation





DIMIN

7

MULTIPLICATION
AND DIVISION:
COMPUTATION AND
RELATIONSHIPS

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 7 Multiplication and Division: Computation and Relationships

ESSENTIAL QUESTIONS

- How can the relationship between multiplication and division be used to solve problems?
- How can we use our knowledge of place value to multiply and divide more efficiently?
- in How can we use different strategies to help us understand multiplication and division?
- How do we use math to help us understand and solve real-world problems?







Unit Storyline



Unit 7 Multiplication and Division: Computation and Relationships

The Multiplication and Division Computation and Relationally on textends students' working inowiedge of multiplication and division of two 1 digit numbers and decomposing numbers. Students apply these understandings to the context of transportation. By observing video footage and investigating problems related to different modes of transportation, students enhance their anderstanding of multiplication and division.

Unit Standards

4.A.2	Use place value understanding and properties of operations to perform must digit and met.c.
4.A.2.b	Multiply a whole number of up to foul digits by a one-digit whole number using strategies based on a short which the earlier of the earlier o
4.A.2.c	Multiply two two-digit humbers, with and without regrouping, Jang strategies based on place value and the properties of operations
4.A.2.d	First whole-runder quotients and remainders withrup to foundly tid dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division
4.A.2.e	ustrate and explain calculations using equations of moders
4.C.1.s	Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Unit 7 Structure and Pacing

This structure and pacing guide is based on a Mathematics program that is 60 minutes/
5 days a week. See the Alternate Pacing Guides for recommendations for 45-minute and 90-minute lessons.

Concept 1: Multiplying by 1-Digit and 2-Digit Factors

Excentia Questions

- Blow-cantive use our knowledge of place value to multiply and divide more efficiently?
- How can we use different strategies to help us understand multidigit multiplication and division?

Students will explain how they use place value to multiply.

How do we use math to help us understand and sowe real-world phoblems?

The Area Model Strategy

Learning Objectives

- Students will use area models to représent two-digit by one-digit multiplication.
- Lesson 1

Student Learning Targets

- · I can use an area model to represent two-digit by one-digit that plication
- I can explain how lyse place value to must ply.

The Distributive Property

Learning Objectives

Students will use an area model to multiply a one-digit number by a whole
number with up to faur digits

Students will apply the distributive property of multiplication to multiply a

Students will explain the distributive property of raultiplication

one-digit number by a whole number with up to four digits.

Lasson 2

Student Learning Targets

- I can use an area mode, to multiply a one-digit number by a whole number with
 up to four digits
- can explain the distributive property of multiplication.
- car apply the distributive property of in without to solve multiplication properts

Unit 7 Multiplication and Division: Computation and Relationships

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Multiplication and Division: Computation and Relationships

Unit Structure and Pacing cont'd

The Partial Products Algorithm

Learning Objective

Lesson 3

 Students will use the banda "products a gorithm to multiply a direction number by a whole number with up-to-four digits

Student Learning Target

."can use the partial products algorithm to must pay a one-digit number by a whole
number with up to four digits.

The Standard Multiplication Algorithm

Learning Objectives

- Students will estimate products of multiplication problems.
- Students will use the standard algorithm to multiply a one-digit number by a
 whole number with up-to-four digits

Student Learning Targets

- İ, Can. Estimate Eroducts
- I can use the standard a gentum to multiply a one-digit number by a whole number with up to four digits

Review Connecting Strategies

Learning Objective

Lesson 5

Lasson á

Lesson 4

 Students will use the standard algorithm to multiply a one-digit number by a whole number with up to four digits

Student Learning Target

 I can use the standard algorithm to multiply a one-digit number by a whole number with up to four digits

Two-Digit Multiplication

Learning Objectives

- Students will total fly patterns when multiplying two multiples of 10
- Students will must ply a twe-digit number by a multiple of 10
- Students will assess the reasonableness of an answer using estimation and mental math.

Student Learning Targets

- I can identify patterns when multiplying two multiples of 10
- I can multiply a two-digit number by a multiple of 10.
- I can assess the reasonableness of an answer Lsing estimation and mental math.

Learning Objective

Lesson 7

 Students will use the area model to solve two-digit by two-digit multiplication problems

Student Learning Target

. I can use the area mode, to solve two-digit by two-digit multiplication problems

Algorithms and Two-Digit Multiplication

Learning Objective

Lesson 8

 Students will apply a variety of stratagres to so we two-digit by two-digit multiplication problems

Student Learning Target

 I can apply a variety of strategies to solve two-digit by two-digit multiplication problems

Putting it All Together

Learning Objectives

Lesson 9

- . Students will apply the Three Reads strategy to analyze and solve story problems
- Saudents will add, subtract, or multiply to some story problems

Student Learning Targets

- I'dan apply the Three Reads strategy to analyze and solve story problems.
- . I can add, subtract, or multiply to solve story problems

Concept Check-In and Remediation

Learning Objective

 Students while work to correct misconceptions and errors related to multiplying by one-digit and two-digit factors

Student Learning Target

 I can solvect my miscanceptions and errors related to multiplying by one-digit and two-digit factors

Unit 7 Multiplication and Division: Computation and Relationships

Concept 2: Dividing By 1-Digit Divisors

Essential Questions

- How can the relationship between multiplication and this ion be used to some problems?
- How earline use our knowledge of place value to multiply and divide more efficiently?
- How can we use different strategies to help us understand mult, digitary hiplication and envision?
- How do we use math to help us understand and solve real-world problems?

Exploring Remainders

Learning Objectives

- Students will identify the dividend, divisor, and quotient of a division problem.
- Students will solve division problems
- Students we explain what a remainder represents in a division problem.

Lesson 10

Student Learning Targets

- mean Townsty the dividend, division, and quotient of a division problem.
- Lean some division problems
- Lean Explain What is remainder represents in a division problem.

Patterns and Place Value in Division

Learning Objective

Lesson 11

 Students will use prace value, multiplication facts, and patterns with zeros to divide multiples of 10, 100, and 1,000 by one-digit divisors

Student Learning Targets

 I can use place value, multiplication facts, and patterns with zeros to divide multiples of 10, 100, and 1,000 by one-digit divisors

The Area Model and Division

Learning Objective

Lesson 12

Students will use area mode sito represent and solve division problems

Student Learning Target

ucan use area models to represent and solve division problems

--

The Partial Quotients Algorithm

Learning Objective

Lesson 13

 Students will use the partial quotients algorithm to divide dividends with up to four digits by one-digit divisors

Student Learning Target

. I can use the partial quotients algorithm to so ve division problems

The Standard Division Algorithm

Learning Objectives

- Students will apply their understanding of place value to solve division problems
 using the standard algorithm
- Students will estimate quotients using properties of place value and patterns in multiplication and division

Lesson 14

Lesson 15

Student Learning Targets

- I can estimate ductionts using properties of place value and multiplication and division patterns
- I can apply my knowledge of piece value when using the standard algorithm for division.

Division and Multiplication

Learning Objectives

- Students we use properties of place value to accurately record quotients
- Students we use the relationship between it ultiplication and division to check the accuracy of quotients

Student Learning Targets

- earl use properties of place value to accurately record quotients
- . I can use multiplication to check answers to division problems

Unit 7 Multiplication and Division: Computation and Relationships



Multiplication and Division: Computation and Relationships

Unit Structure and Pacing cont'd

Solving Challenging Story Problems

Learning Objectives

- Students will organize information in stary problems to determine when to add, subtract, multiply, or divide
- Students will solve story problems using addition, subtraction, multiplication, and division.

Lesson 16

Student Learning Targets

- Lean-organize information in story problems to determine when to add, subtract, multiply, or divide
- san use addition, subtraction, multiplication, and division to so ve story properties.

Concept Check-in and Remediation

Learning Objective

 Situdents will work to correct my musconceptions and arrows related to dividing by one-digit divisions

Student Learning Target

 I can consci my misconceptions and errors related to dividing by care-digit divisors

Alternate Pacing Guides

If Mathematics instruction is based on 45 minutes/5 days a week, do the following:

Reduce ACCESS by 3 minutes

Reduce BuiltD by 6 minutes

Reduce CONNECT by 2 minutes

Reduce WRAP-UP by 2 minutes

Strategies for reducing time in each section:

- Discuss fewer examples
- E. minate Shou der Parther conversations
- . Shorten c ass discussions
- Work with students to complete ACCESS problems

If Mathematics instruction is based on a combination of 45 minutes/4 days a week and 90 minutes 1 day a week, do the following:

Fig low the 45-minute approach for the 45-minute days

Teach two 45-minute lessons the the 90-minute day

If Mathematics instruction is based on 90 minutes/5 days a week, do the following:

Ingrease ACCESS by 5 minutes

Increase BU LD by 20 minutes

ricrease CONNECT by 3 minutes

ncrease WRAP-UP by 2 minutes

Strategies for increasing time in each section:

- Discuss additional examples as needed
- Extend classid scussions
- At owitime for hands-on work with man pulatives and models.
- Provide additional practice problems for students who need additional practice.
- Encourage students to share and model their problem-solving strategies

Unit 7 Multiplication and Division: Computation and Relationships

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Mathematical Background Knowledge

Multiplication and division (along with fractions and decimals) are the major work of Primary 4, it is important that students are provided with origining opportunities throughout the school year to build understanding of and improve fluency in these areas

Two-Digit by One-Digit Multiplication

In Firmary 3, students multiplied two 1-digit numbers and built fluency multiplying within 100 by practiong a variety of strategies such as using manipulatives, drawing platures, and building arrays. Students also discovered the importance of place value in understanding and building numbers and identified patterns when multiplying by must ples of 10. In Primary 4, they connect their understanding of multiplication as equal groups to visual models that array them to develop an understanding of what is happening when they multiply two digit numbers by given gift numbers.

Students are remitted how always can be used to solve problems and learn now arrays are talated to alies models. An area model is a rectangle is found by multiplying its length by its width. When using an area model for multiplication, the factors become the length and the width of the rectangle. The factors are then decomposed for broken apart, using place value and the rectangle is divided accordingly into smaller rectangles. The product is the sum of the areas of the smaller rectangles. Students also apply the patterns they observed when multiplying by multiples of 10 in order to decompose or break apart, numbers and use the area model to multiply a one-digit number, by a number with up to four digits. Students explore the distributive property of multiplication as the property that makes it possible to decompose numbers when multiplying. The Distributive Property of Multiplication states that multiplying the sum of two or more addended by a number will have the saffle abswer as multiplying each addended individually by the number and then adding the products together. Students will see the Elistributive Property of Multiplication as an alternative way of recording the calculations will change the colored right the calculations will change the colored right the calculations will be colored when using an area model.

Multiplication Algorithms

Students are introduced to the concept of an algorithm—a procedure or a set of steps to follow in order to perform an operation—and to the partial products a gorithm for multiplication. The partial products algorithm is similar to using an area-model but without the visual supports. This is important because it moves students along in their development from concrete to abstract representations of multiplication. When using the partial products algorithm, the problem is written vertically which will prepare students for the standard algorithm in apcoming assens

Finally, students are introduced to the standard algorithm for multiplication (up to 4 digits by 1 digit) it is important for students to be exposed to the standard algorithm as it is the most efficient strategy for multiplying. Place value is an important concept in this strategy as students must regroup in order to calculate products correctly. For example, if students

are multiplying 428×3 , they will start by doing $8 \times 3 - 24$. They will need to know that 24 ones can be regrouped into 2 Tens and 4 Ones when using the standard algorithm. Students also practice estimation products in this lesson. They use estimation to help assess the reasonable eness of their answers. Being able to-mentally gauge whether an answer is correct base tion an estimate is an essential axis. In mathematics

As part of their study of the standard algorithm, students analyze where grouping occurs and dentify errors in using the standard algorithm, which is important in he pung them correct their own misconceptions.

Two-Digit by Two-Digit Multiplication

Students apply their understanding of the Distributive Property and place value as they begin to multiply two-2-digit numbers. Students start by drawing on their knowledge of patterns when multiplied a one-digit number by a multiplied of 10 to discover what happens when two multiplied For example, students recall that $3 \times 40 = 120$ and extend this pattern to see that $30 \times 40 = 1200$ Students should recognize the basic fact 3×4 and then place two zeros at the end of the product, one for each zero in both factors. Students then further their understanding of the Distributive Property of Multiplication by decomposing a two digit number in order to multiply by a multiplication by decomposing a two digit number in order to multiply by a multiplication by decomposing math in this lesson and discuss whether answers are reasonable, or whether they make sanse given the relative size of the factors

Students further their upderstanding of area models and discover how to use them to solve two-digit by two-digit multiplication problems. Once arisim, students draw on their knowledge of the Distributive Property of Multiplication and decomprise out in two-digit factors in order to multiply Since they are multiplying two 2-digit numbers their area models will have four sections and to impart all products. This strategy allows students to better understand the part all products algorithm and the standard algorithm for two-digit multiplication. Students build on the area model for two-digit by two-digit multiplication by practifying the part is products algorithm. They then connect the part is, products algorithm to the standard algorithm for multiplication. Students discuss the need for efficiency when sowing multiplication problems and practice estimating to determine if their answer is reasonable it is likely that students will not master the standard algorithm at this time. Continue to give students opportunities to practice multiplying throughout Primary 4.

In Primary 3, students solved two step story problems invowing addition, subtraction, multiplication and visit in problems, students must first thin, about what is happening in the problem. Then, they must choose which operation is needed to solve. More than one operation is sometimes necessary. Students are introduced to the Three Reads strategy. This strategy is designed to help students understand a problem by reading the problem a number of times, each time with a different purpose. They read the problem and entertain what is happening in the problem a second time to think about what the numbers in the problem and what they might mean, and within to think about what quest on the problem could be asking.

In Primary 3, students with eight on building their conteptual understanding of multiplication and division. They explored different world problems and learned to describe multiplication and division problems as containing "equal groups" of objects in Primary 4, students retained in the problems are division are related operations and how multiplication can be used

Unit 7 Multiplication and Division: Computation and Relationships

Multiplication and Division: Computation and Relationships

to help solve division problems. To begin, students beam the vocabulary associated with division. The dividend is the number that is being divided into equal groups. The divisor is the number of equal groups on the number in each group depending on the context of the problem. The quotient is the answer to a division problem, either the number of equal groups or the number in each group depending on the context of the problem. Students also explore what happens when the division problems. This will prepare students for q viding by one gight divisors the problems. This will prepare students for q viding by one gight divisors the problems.

Students deepen their understanding of division by dividing multiples of 10, 100, and 1,000 and identifying patterns related to place value it is the pful to recal, the patterns of multiplication that students learned previously, since the patterns are similar for division. Students practice finding related facts and then adjusting the number of zeros in the quotient (4,200 = 6 = 700). Recognizing patterns related to place value helps students develop an understanding of dividing dividends with up to four digits using models and algorithms.

Division Algorithms

Students first learn how to use an area mode for duris on. When using this model, students must think about decomposing the dividend into parts that can be evenly divided by the divisor. Therefore, there are multiple ways to correctly decompose a dividend using this method. When dividing 256 + 8 for example, the dividend collide decomposed as 240 + 16, as 160 + 80 + 16, or 80 + 80 + 80 + 8 + 8, all of which are correct. Students then calculate the quotient by figuring out how many groups of 8 they have. No matter from they decompose the divident there are 32 groups of 8 Any amount left over that cannot be evenly divided becomes the remainder. This is an important step for students in developing concrete knowledge of division before they move on to werk with more abstract algorithms for dwiston.

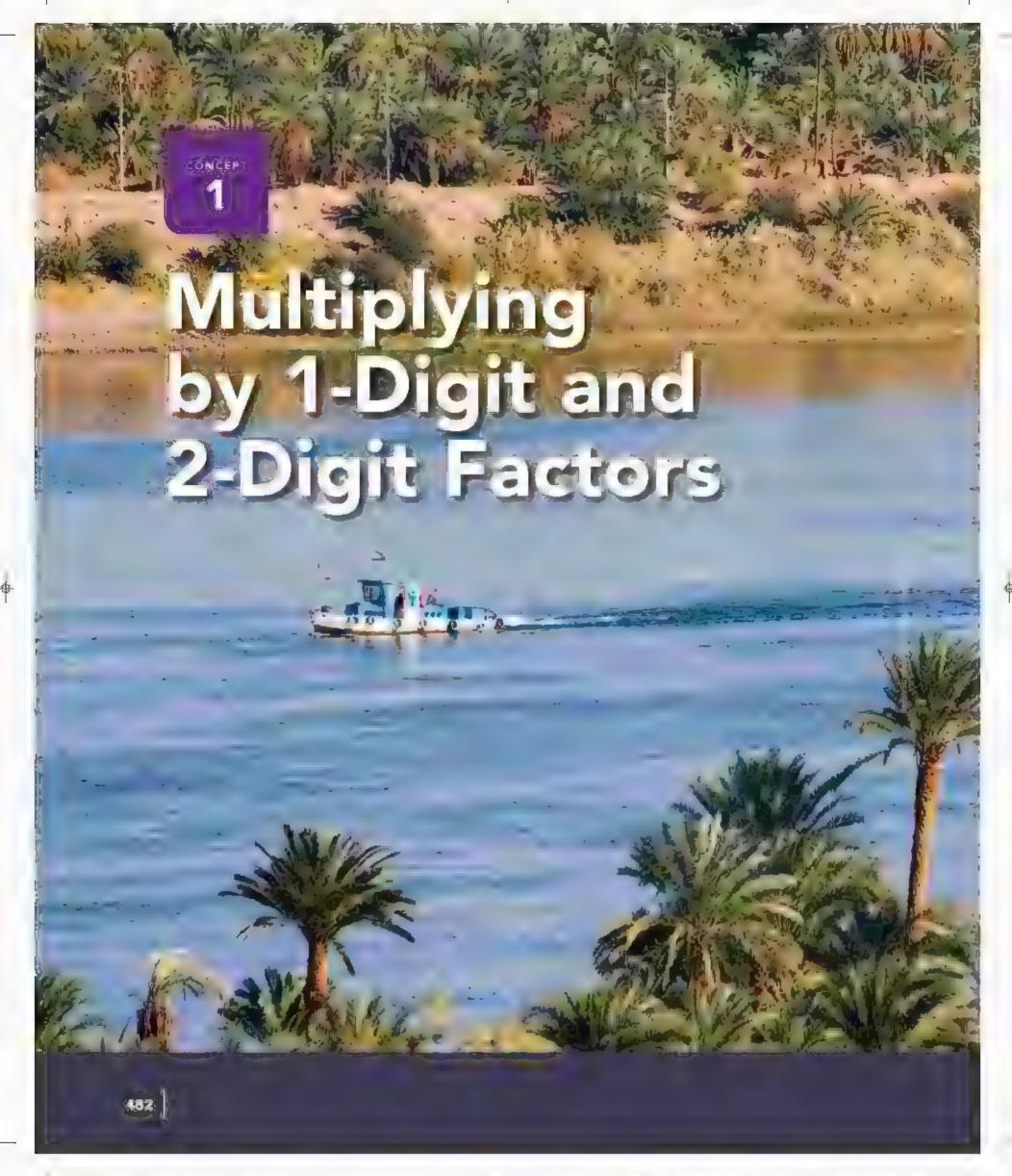
If many 4, students expicite the ationship between division and repeated subtraction Students think about how many times the divisor can be subtracted from the dividend (74 ± 6 ± 6 ± 6 ± 0 so 24 ± 6 ± 4). Then, students are introduced to the partial quotients algorithm for division, Just as with the area model, students have to decompose the dividend not multiples of the divisor. Students must think about the patterns of multiple cat bright and division therefore have learned and utilize their knowledge of place value to accurately determine the parts of the quotient. When using the parts quotients a gorithm there are multiple ways students that decompose the dividend and still advents a correct solution he parts quotients a gorithm if performed vertically use the standard algorithm for division which is introduced in the next lesson. Both of these methods help students develop the condensation of division before students are introduced to the standard a gorithm.

To prepare for using the standard algorithm, students do a Quick Draw of the dividend in Base. Fen block drawings in 490 ± 3, students draw one Hundred in each of the three groups. Students then regroup the one Hundred left over in division, regrouping occlus from aftito right in a dividend. The one Hundred that is efficient is regrouped into 10 Tens before students continue to divide. Seeing this process helps students make connections when they are introduced to the standard algorithm. Students are they not to master using the standard a gorithm at this time mowever it is important for them to be exposed to and to practice this method prior to Primary 5 when they will be expected to filterity divide multidigit whole numbers.

Solving Story Problems with the Four Operations

Students continue to use estimation to assess the reasonableness of an answer, but also earn to use the reasonable between division and multiplication as a tool for checking the accuracy of answers. Students apply their learning milling 7 to solve multistep story problems involving addition, subtraction, multiplication, and division, in order to successfully solve story problems, students must first think about what is happening in the problem. Then, they must choose which operation is needed to solve. More than one operation is constitues necessary. Students use the Three Reads strategy which is designed to help students understand a problem by reading the problem a number of times, each time with a different intention. They read the problem once to understand what is happening in the problem, a second time to think about the numbers in the problem and what they might mean, and a third time to think about what question the problem could be asking. Students are also asked to him a about math in their own worlds, it is important for students to see that math does not any happen in the cassroom and that math is relevant to them and their own lives.

Unit 7 Multiplication and Division: Computation and Relationships



Concept Overview

In Concept 1: Multiplying by One-Digit and Two Digit Factors students build an their learning in Primary 3 to deepen and extend their understanding of multiplication and improve their procedural fluency. They explore three different strategies for multiplying—the area model strategy, the partial products algorithm. They apply their knowledge of place value, patterns when multiplying by multiples of 10, and multiplication facts to solve multiplication problems. Good mathematicians make connections between mathematical concepts and use those connections to solve problems. This concept encourages that practice

Concept Standards

- 4.A.2 Use place value understanding and properties of operations to perform multiplight arithmetic.
- **4.A.2.b** Multiply a whole number of up to four digits by alone-digit number using strategies based on place value and the properties of operations
- **4.A.2.c** Multiply two two-digit numbers, with and without regrouping, using strategits based on place value and the properties of operations
- 4.A.2. Illustrate and explain calculations using equations or mode 5
- **4.C.1.d** So ve multistep word problems posed with whole numbers using the four operations, including problems in which remainders must be interpreted
- **4.C.1.a** Assess the reasonableness of answers as no mental computation and estimation strategies including rounding

Concept | Multiplying by 1-Digit and 2-Digit Factors



Concept Planner

All lessons are designed to be 60 minutes. The materials listed in this chart are items to gather for each group. Items for the class or for individual students are indicated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
The Area Model Strategy	Base Ten blocks (Optional)	Area model Deconypose	Students will use area models to represent two-digit by one-digit multiplication Students will explain now they gas place yalling to multiply.
2 The Dignoputive Property	No add tona. Maker als neaded	Area mode: Decompose Distributive Property of Multiplication	Students will use an allea mode to multiply a one-digit llumber by a whole number with up to four digits
			Students will explain the Distributive Property of Multiplication
			Students will apply the Distributive Property of Multiplication to four digits four digits **The content of the content





- White there are multiple ways to decompose a number, numbers should decompose using place value when using an area model for multiplication. For example, it is passible to decompose 23 in many different ways, including 17 and 6, 10 and 13, or 14 and 9. However, 23 should be decomposed into 20 and 3 when using an area model for multiplication.
- Students may incorrectly decompose the factors accounting to their digits rather than according to the value of their digits. They may decompose 45 as 4 and 5 rather than 40 and 5.
- While there are multiple ways to decempose a number, humbers show the decomposed using place value when using an area mode for multiplication of spossible to decompose 243 in many different ways However, 243 should be decomposed into 200, 40, and 3 when using an area model for multiplication.
- Students may get confused with how many zeros to place at the end of a product. For example, students may write 7 x 3,000 = 2,100 instead of 7 x 3,000 = 21,000. Students may also write 4 x 500 = 200 instead of 4 x 500 = 2,000.



Opportunities for Formative Assessment

Multiplying with the Area Model Error Analysis, Practice, Check Your Understanding

Distributive Property and Area Models, Let's Try t, Making Connections. Practice, Check Your understanding

Concept & Multiplying by 1-Digit and 2-Digit Factors

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
The Partia Products Adjornthm	Mo adamonal materas needed	Area mode. Clistroutive Property of Multiplication Algorithm Partie products augorithm	Students will use the parties products algorithm to mult ply a cheedigh number by a whole number with up to four dig as
The Standard Mu tip leation Algorithm	■ No additional materals needed	Standard augorithm Districtive Property of Multip Icetion Area mode Partial products	Students Will estimate products of multiplication problems. Students Will use the stendard agorithm te multiply a one- dig thember by a whole number with up to four digits
Review Connecting Strategles	 Lesson 5 Matching the Models Cards Sats A. B. and C. (Photocopy the Black, he Master and have students work in groups of three Each student in the group will get a different set of cards.) Success 	Review vocabu ary as needed	Students will use the standard agorithm te multiply a one-cight multiply a with a whole humber with up to four digits.
Mutplication	• Na add tiena mafer a s needed	Distributive Property of Multip Ication	Students with identify patients when multiplying two multiples of 10 Students will multiply a two-digit humber by a multiple of 10 Students will assess the reasonableness of an answer using estimation and mental math

Opportunities for Formative Assessment Common Misconceptions and Errors Stradents may get confused with now many zeros to place at: Partia Products, Fill in the Blanks the and of a product. For example, students may write / x Error Amalysis, Practice Check Your 3,000 - 2,100 nateact of $7 \times 3,000 = 21,000$ Students may Understanding also write 4 x 500 = 200 instead of 4 x 500 = 2,000 Students may line up the products incorrectly before adding to find their answer. Students somet, mes have diff au, ty demonstrating Using the Standard Algorithm, Writing proper regrouping when using the standard algorithm for About Math, Practice, Check Your multiplication. They may omit writing the digit above the briderstanding. correct place or they may attempt to place two digits at a time in the product Students sometimes have difficulty demonstrating Can You Spot hit, Fix the Error, Writing proper regrouping when using the standard argorithm for About Math, Practice, Check Your Iffult pleation. They may forget to record their regrouped understand na digit or attempt to place two digits if the product at once · Students may have difficulty determining the number of Ten Times, Multiplying by a Multiple of zeras in a product when must plying by mustiples of 10, 10, Error Analysis, Practice, Check Your especially when the broad of the basic fact ends in zero. understanding For example, students may think that 80 x 50 = 400 tather than 4,000

Concept & Multiplying by 1 Digit and 2 Digit Factors



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Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
7 Area Medels and Iwo Digit Mu, op casion	eesson 7 Area Model Cards (Photocopy the Blackine Master) one set per student) Scissors Gue sticks	Review vocabulary as needed	Students will be able to use the area mose, to solve two-digit by two-digit by two-digit by two-problems
8 A gorthma and Two D ga Multiplication	No adminional minieras needed:	Review vocabulary as mesoled	Students will apply a variety of strategies to solve two-digit by two-digit by two-digit multiplication problems.
9 Mattag It Ali Together	Lesson 9 Story Problem Cards Photocopy the Blackline Master at the end of the volume, one card per student)	Review vocabulary as meeded.	 Students will apply the Three Reads strategy to analyze and solve story problems Students will add subtract, or inultiply to solve story problems.
Concept Check-in and Bemediation	Watatuale wath	Review concept vocabulary as needed	Students will work to correct meconceptions and errors related to multiplying by one-digit and two-digit. factors

Opportunities for Assessment:

maddition to the assessment opportunities included in this chart, each concept will include a Concept Check-in

Common Misconceptions and Errors

- Sturtents may incorrectly decompose the factors in the phase making it difficult for them to use the multiples of 10 to solve the problem.
- Students may not multiply the correct numbers together glving them an incorrect product
- Students may have difficulty decomposing mambers when a phopiam is written vertically
- Students may have a hard time keeping track of the pathal products and now to distribute the numbers properly.
- Students may solve part of a problem and think they are
 finished using strategies to thoroughly understand what a
 happening in a problem before sowing is an important step
 in the problem-sowing process.
- Students who rely on key words may misinterpret what is happening in the problem using regwords in context is helpful in problem so ving, but they are not a footproof sout on strategy.
- White there are multiple ways to decompose a humber,
 mumbers should be decomposed using place value when multiplying
- Students may incorrectly decompose the factors according to their digits rather than according to the value of their digits
- Students may have difficulty determining the number of zeros in a product when multiplying by multiples of 10 especially when the product of the basic fact ends in zero.
- Students sometimes have difficulty demonstrating proper regrouping when using the standard algorithm for multiplication. They may forget to record their regrouped digits in the product at once
- Students may have a hard time keeping track of the part all
 products and how to distribute the numbers properly

Q-

Opportunities for Formative Assessment

Be the Teacher, Working with the Area Mode, Wilting About Math Practice Check Your understanding

Let's Try the Standard Algorithm.
Writing About Meth. Practice, Check
Your Understanding

Three Reads, Writing About Math, Practice, Check Your understanding

Concept 1 Multiplying by 1 Digit and 2 Digit Factors

LESSON 1 The Area Model Strategy

Lesson Overview

to this essen, students use their knowledge of prace value and area modes to severop an understanding of new to murbo y two-digit numbers by one-digit numbers.

Lesson Essential Question

 "How can we use our knowledge of place value to multiply and divide more afficiently?"

Learning Objectives

In this lesson

- Students will use area models to represent two-digit by one-digit multiplication
- Students will explain how they use place value to multiply

Grade-Level Standards

4.A.2.b Multiply a whole number of up to four digits by a one-digit number using strategies based on place value and the properties of operations

4.A.2. Light and explain calculations or mode s



Vocabulary Check-in

area mode, decompose-



Materials List

Base Ten blocks (optional)



Preparation

We adding not preparation is negligible

DIGITAL



Lesson 1

The Area Model Strategy

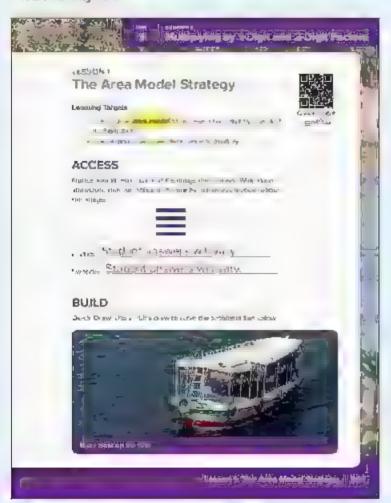


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ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- While there are trustiple ways to decompose a murpher, students should decompose numbers want place value when using the area model for multiplication, for example, it is possible to decompose 23 in many different ways including 17 and 6, 10 and 13, or 14 and 9. However, 23 should be decomposed into 20 and 3 when using an area model for nourity leafton.
- Students may incorrectly decompose the factors
 according to their digits rather than according to
 the value of their digits. They may decompose 45
 as 4 and 5 rather than 40 and 5.

Notice and Wonder

- Direct students to Lesson 1 ACCESS Notice and Wonder
- 2 Ask students to look at the image and to write down what they notice and wonger After 1 in nute lask students to share a few of their ideas.
- 3 Tell students that this image represents an array for the multiplication problem 4 × 18. Remind students that an array organizes objects into rows and columns.
- Asir students where they see 4 in this marte and where they see 13 in this made. Explain that this array uses Base Ten blocks to mode, the problem Each roding resents 10 and that each square represents 1. Therefore, this array shows four rows with 13 in each row.

Lasson 1 - The Area Model Stratagy

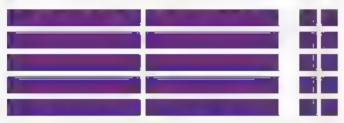


BUILD (40 min)



Quick Draw (20 mint)

- 1 Direct students to Lesson 1 BULD Quick Draw
 Asil a student to read Problem 1 aloud to the class
 Explain that if the river bus holds 22 passengers
 and makes 5 trips, that means the bus holds 22
 passengers 5 times, which tells us we can find the
 maximum number of passengers by sowing 22 x 5
- 2 Do a Frank A oud to mode how to use Base Fen to ocks to multiply 22 × 5. First, create an array using Base Ten to saks for 22 × 5. Place 2 Tens and 2 Ones in a row. Then, add 4 Priore rows of 22 so there are 5.



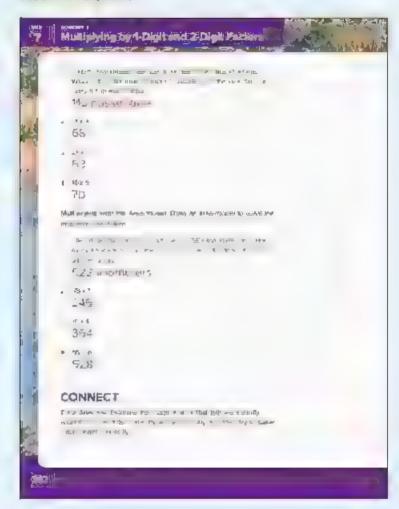
- 3 Begin finding the product of 22 × 5 by counting the brocks. Model counting the Tens (100) and then the Ones (10), then find the sum (110).
- 4 Snare that sometimes a Quick Draw can be used instead of Base Ten placks to solve a multiplication problem, especially when the numbers are small.
- 5 Mode how to use a quick draw for 22 x 5. Draw two lines to represent the Tens and two dots to represent the Ones (Note that, we could draw small squares, but it would take longer)



6 Ask students to describe how the Quick Draw array model is similar to the Base Ten block array mode Ask students to copy the array into their Student Edition

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Direct students' attention to Problem Z. Ask students how they would show 17 if they had Base len blocks. Call on students to share their answers. Ask students to create a Quick Draw array to solve 17 x 4 (68). Ask a volunteer to draw their array on the poard. Allow students to correct their work, if necessary



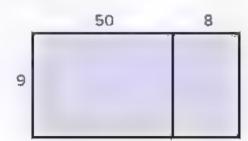
8 if there is time eft in the 20-minute segment as l'istudents to practice using Problems 3 and 4

Multiplying with the Area Model (20 mm

- 1 Write 58 x 9 on the board. Ask students to talk to their Shoulder Parther about how they would use a Quick Draw for 58 x 9. Encourage them to discuss what might be different about solving this problem. Students should notice that it would take allong time to draw 58 x 9 and that it may be difficult to count the Tens and Ones accurately Explain that since these numbers are larger it would not be efficient to use a Quick Draw array to solve.
- 2 Model how to draw an area mode, to was a ze 58×9 . Draw a rectangle that is onger than it is tall. Discuss how the sides of the rectangle represent each factor in the proplem (The short side represents 9 and the long side represents 58.)



- 3 Ask students the value of each digit in 58 (50 and 8) Explain that students have just decomposed this number using place value.
- 4 Spit the rectangle into two parts by grawing a vertical line to represent now 58 was decomposed. Label the rectangle by writing 50 and 8 above each section of the rectangle and by writing 9 on the side.

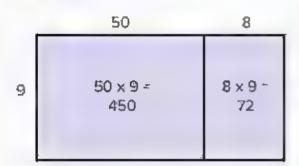


Laszon 1 - The Area Model Stratagy

LONGER

Multiplying by 1-Digit and 2-Digit Factors

5. Demonstrate multiplying the decomposed multiplication problem by writing and solving 50 x 9 and then acding the products 450 ± 72 = 522

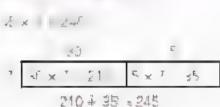


450 + 72 -522

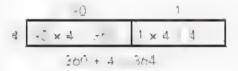
the Area Model and allow students to copy the area model for Problem 1. World with students to so, ve. Problems 2–4 (as time a lows)

Answer Key for Multiplying with the Area Model:

1 58 x 9 = 522 m tometers



3 91 x 4 = 364

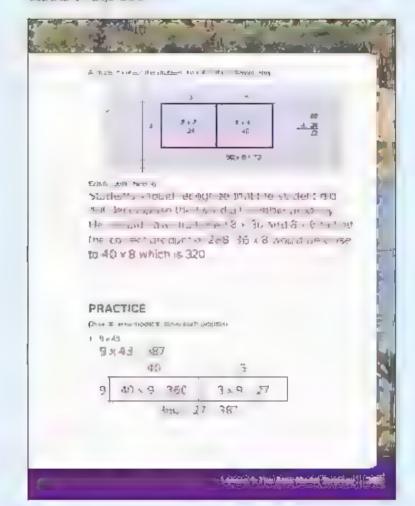


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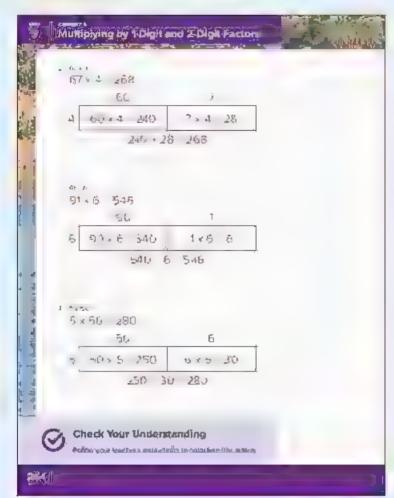






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CONNECT (7 min)



Error Analysis

Direct students to "esson 1 CONNECT Error Analysis
As students to review the work and answer, identify
what the student did correctly and incorrectly, and try to
solve the problem correctly

「SACHER WITH Consider Word this activity as a fiverent to ill in mine which stude to move should stude to move s

Answer Key for Error Analysis:

The stadent did not decomplise the two digital and the property of the stadent did not decomplise the two digitals are the second of the secon

WRAP-UP (3 min)

Let's Chat About Our Learning

Ask students to reflect on how they used place value in today's lesson. By the end of the discussion, make sure that students see that they used place value when decomposing two-digit factors, in multiplying the Tens and Ones in their modes, and in regrouping Tens and Ones to find a product

PRACTICE

Direct students to Lesson 1 PRACTICE and have them complete the problems. Address student errors and imisconceptions.

Laszon 1 - The Area Model Strategy



DAGE OF

Multiplying by 1-Digit and 2-Digit Factors

Check Your Understanding

Draw an area mode to solve each problem

1 73 x 4 1= 291



2 9 x 43 1 ,5



3 fox 25 = 50









Materials List

No additional materials needed



Preparation

No additional preparation freeded

DIGITAL



The Distributive Property



egint4033

LESSON 2 The Distributive Property

Lesson Overview

In this lesson, students continue to use area models to so ve multiplication preblems and further develop their understanding of the Distributive Property of Multiplication

Lesson Essential Question

 How can we use our knowledge of place value to multiply and divide more efficiently?

Learning Objectives

In this lesson

- Students will use an area induction mustiply a one digit number by a whole number with up to four digits.
- Students will explain the Distributive Property of Multiplication
- Students will apply the Distributive Property of Multiplication to multiply a one-digit number by a whole number with up to four digits

Grade-Level Standards

4.A.2.b Multiply a whole number of up to four clidits by a one-digit in imperiusing strategies based on place value and the properties of operations.

4.A.2. Ustrate and explain calculations using equations of modes



Vocabulary Check-In

area, model, decompose, Distributive Property of Muliphration

Lessen Z. The Distributive Fregerty

ACCESS (5 min)



COMMON MISCONCEPTIONS AND ERRORS

- While there are multiple ways to decompose a number, students should decompose numbers using place value where using the area mode for multiplication. For example, it is possible to decompose 23 impany different ways including 17 and 6, 10 and 13, or 14 and 9, However, 23 should be decomposed into 20 and 3 when using an area mode for multiplication.
- Students if ay get confused with now many zeros to place at the end of a product. For example, students may write 7 × 3,000 = 2,100 instead of 7 × 3,000 = 21,000. Students may also write 4 × 500 = 200 instead of 4 × 500 = 2,000.

Decomposing Numbers

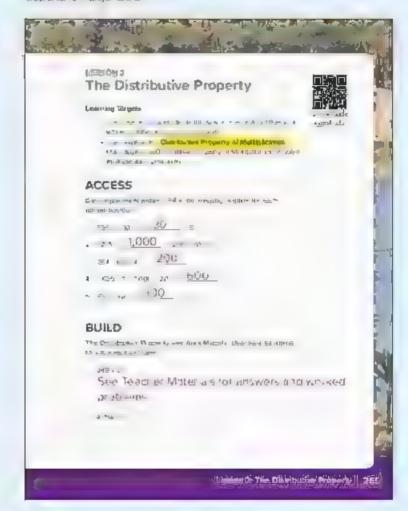
- 1. Direct students to Lesson 2 ACCESS Decomposing Numbers
- 2 Ask stadents to fit in the branks to decompose each number using place value.
- 3. When they are finished, read each problem aloud and natitude students to calcut the answers when prompted

Answer Key for Decomposing Numbers:

1 594 500 + 30 + 4 2 1 2 5 = 1000 + 20 + 20 + 20 + 7 3 100 = 00 + 4 + 20 1 - 25 = 50 + 7000 + 13 + 200 5 35 = 90 + 30 + 2

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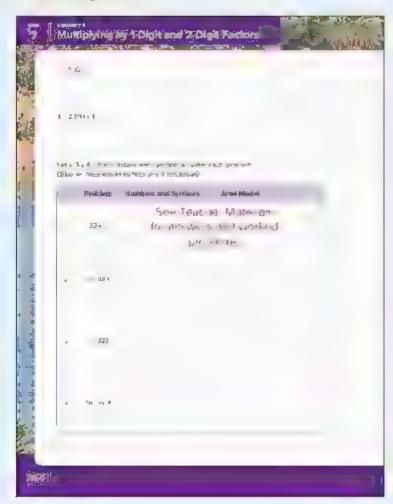
Student Page 265





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Studiert, Page 266



BUILD (45 min)



The Distributive Property and Area Models (15 mm)

- 5 Share with students that the reason Humbers can be decomposed when multiplying is because of the Distributive Property of Multiplication.
- 2 Ask students for the root word in distributive

 1-1 tell Ask a student to describe what it means
 to distribute something fix it ve share, or surretning
 or to give out.
- 3. Direct students to Lesson 2.6.J LD The Distributive Property and Area Models where they will see the problem 249 × 5
- 4 Ask students to their to their Shoulder Parther and discuss how they think they doubt represent this problem using apares mode.
- 5. Exprain that since there is a three-digit number being multiplied by a one-digit number, their area mode will have three sections.
- 6. Draw a ong rectangle divided into three sections and explain that the larger number will be decrimposed across the model. The 5 will be distributed across each part of 249.

- Asi students to decompose 249 so that the value of each digit is represented. + 1 +
- 8 G., de students through and highle area model appropriately and sowing it is computations
- Repeat the process for Problem 2, which has a fourdigit factor Emphasize that the area mode for this problem will have four sections to represent the value of each dudit in the number
- 10. Repeat the process for Problems 3 and 4 if there is time. Reinforce that the area made works because of the Distributive Property of Mintapication.

Lesson 2 - The Distributive Property

Multiplying by 1-Digit and 2-Digit Factors

Answer Key for The Distributive Property and Area Models:

1 249 - 5 1245

5 200 40 9 200×5 1000 40×5 200 9×5 45

249 x 5 (200 x 5) · (40 x 5) · (9 x 5) · (249 x 5) · (200 · 200 · 45 · 1,245 · 249 x 5 · 1,245

2 4,734 x 5 = 22 670

\$ 4000 x 5 20 000 700 x 5 3 500 30 x 5 150 4 x 5 20

4724 / 5 (4.000 x 5, + 1.700 x 5) (30 x 5) (4 x 5) 4724 / 5 = 20,000 + 3.500 150 20 20.570 4724 / 5 = 23.570

3 530 4 7 3 710

30 30 30 500 30 7 300 0 x 7 ± 0

 $5.30 \times 7 = (500 \times 7) + (30 \times 7) + (0 \times 7 = 0)$ $5.80 \times 7 = 3.500 + 210 + 0 = 3.710$ $5.30 \times 7 = 3.710$

4 2 391 - 8 19128

8 2 000 500 90 1 2 000 · 8 = 16 000 300 x 8 2 400 90 x 8 720 1 · 8 = 8

2 391 x 8 = (2000 x 8) = (30(1 x 8) = (90 x 8) = (1 x 8) 2 391 x 8 = 16,000 = 2,400 = 720 + 8 = 19,128 2 391 x 8 = 191,28



Let's Try It (30 mm)

- 1. Direct students to Lesson 2 Build Let's Try it
- 2 Assign students to work in groups of three to solve the problems in their Student part of As students work, walk around and monitor their progress. Encourage students to draw area modes if necessary
- With about five minutes left in BuilD, ask four volunteers to record their group's work on the board (each student should present the answer for one problem)

Answer Key for Let's Try It.

 $(1.090 \pm 0) + (690 \times 8) + (70 \times 8) + 3 \times 8)$ $3.000 \pm 4.300 + 5 \times + 24 = 1 + 34 = 1$

Lesson 2 - The Distributive Property

CONCEPT Multiplying by 1-Digit and 2-Digit Factors

CONNECT (7 min)



Making Connections

Direct students to lesson 2 CGN NECT Making Connections and ask them to so ve the problem with an area mode, or with numbers and symbols

Answer Key for Making Connections:

1 280 x 3

 $1.280 \times 3 = (1.000 \times 3) + (200 \times 3) + (80 \times 3) + (200 \times 3)$ $25^{\circ} \times 13.000 \pm 600 + 240 \pm 0 = 3.840$ canfirmaters

1" rant meters x = otal cent meters

WRAP-UP (3 min)

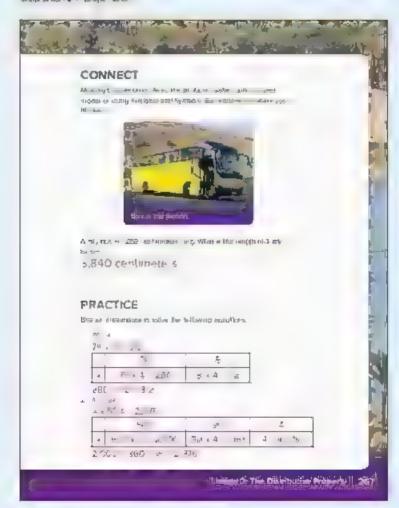


(E) Let's Chat About Our Learning

Asi students to discuss the different strategies for solving multiplication problems. Which strategy sto they find more effective? Why? What questions do they st... have about using the strategies to multiply?

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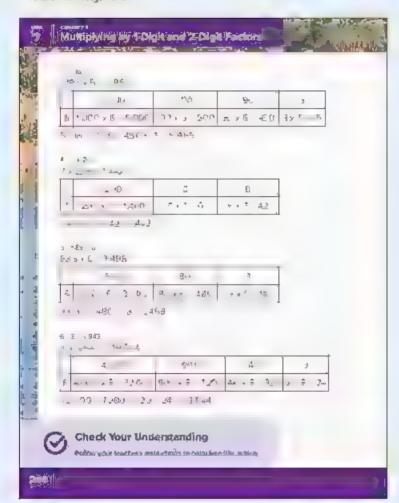
Student Page 267





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Student Page 268



PRACTICE

Direct students to Lesson 2 PRACTICE and have them complete the problems. Address studentierrors and miscenceptions

Check Your Understanding

we are area made, or numbers and symbols, to solve the following equations

3 Look at the area mode. Describe where and how you see the Distributive Property being used

	300	70	4
6	300 × 6 - 1800	70 x 6 = 420	4×6≈ 24

with sprobers, the 6 sheng disp.but-1. es., at of 374 So. 374 \times 6 is the same is 0.17 \times 6 + 0.1 \times 61 \times 61

4. Lau solved 328 x 4 using numbers and symbols.

Describe her error and fix her mistake.

Late a code , when she distributed the 4. She show a nave multiple 1.1. + -0.0 x $0.4 + (0.8 \times 4) = 1.0 + (0.8 \times 4) = 1.0$

LESSON 3 The Partial Products Algorithm

Lesson Overview

in this essen, students build on their understanding of trust digit fourtip cation and learn the partia, products a defining.

Lesson Essential Questions

- "How can we use out knowledge of place value to multiply and divide more efficiently?
- How can we use different strategies to help us understand multiplight multiplication and division?

Learning Objective

In this lesson

 Students will use the partial products argorithm to multiply a one orgit number by a whole number with up to feur orgits

Grade-Level Standards

4.A.2.b Muttiply a whole number of up to-four digits by a crie-digit number using strategies based on place value and the properties of operations



Vocabulary Check-in

area moder, distributive property of multiplication, algorithm, partial products argorithm



Materials List

No additions mater as needed



Preparation

No preparation needed-

DIGITAL



Leannn ?

The Partial Products
Algorithm



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504



Student Page 269



ACCESS (10 min)

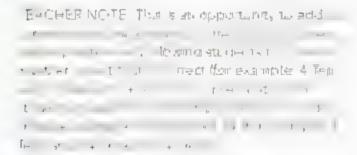


COMMON MISCONCEPTIONS AND ERRORS

- Students may get confined with how many zeros to place at the end of a product. For example, students may write F × 3,000 = 2,100 instead of F × 3,000 = 21,000 Students may as write 4 × 500 = 2,000 instead of 4 × 500 = 2,000
- Students may line up the products incorrectly before adding to find their answer.

The Amazing Race

- 1 Explain to students that they will practice representing and recomposing numbers in different ways. Remind students that although they have been decomposing numbers according to place value in order to multiply, mathematic and need to be able to represent and decompose-numbers in different ways.
- Ask students to help you decompose the number.
 Ask students to help you decompose the number to think of several ways to decompose the number. Record students' ideas on the board.



- 3 Direct students to Lesson 3 ACCESS The Arnaging Race Explain to students that they will, have three minutes to fill, in as many of the boxes as they can with different representations of a number
- After three minutes, ask students to share their answers. Record their work on the board and encourage students to add new answers to their grids.

Lesson 3 - The Partial Products Algorithm

50

7 Multiplying by 1-Digit and 2-Digit Factors

BUILD (40 min)



Partial Products (30 m.n)

- finare that mathematicians often use procedures or a set of steps caused an algorithm to help them to solve math problems. Today students will earn the partial products a gorithm for multiplication
- 2 Direct students to sesson 3 B. LD Partial Products and ask students to selve the problem using the area mode. Ask a student to draw their area model on the poard

	₹	_£.	1
4	700 × 4 2 600	%'×# 1=1	1 × 4 4

2 800 + 120 + 4 = 2 924

3 Model using the partial preducts a gorithm to solve 731 × 4. Remind students that digits in the same place in numbers must be lined up properly when adding

731

к 4

2,800 (700 × 4)

120 (30 × 4)

4:([x 4]

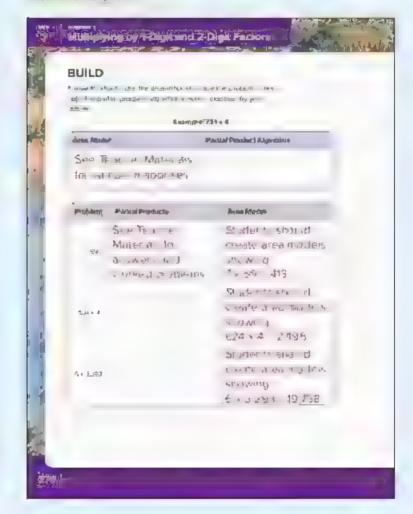
2, -24

TEAC FRING TE THE THOUTHOUT OF A PROBLET OF A PROBLEM OF

4. Ask students to discuss with a partner the similarities and differences pertween the partner products algorithm and the multiplication strategies they have learned

Stampents of a traction and a second of the second of the period of the second of the

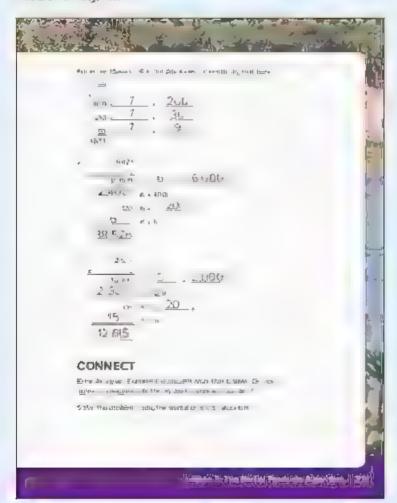
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5 Ask students to copy the partial products example into the Student Editions

6. Guide students through the additional problems reminding them to line up the products carefully according to place value.

Answer Key for Partial Products:

Fill in the Blanks (10 mm)

- 1 Direct students to Lesson 3 EU LD.Fr In the Blanks Golover the directions together and ask students to solve the problems.
- At the end of Bu...D, go ever the answers with students

Lesson 3 - The Partial Products Algorithm

LORGER D

Multiplying by 1-Digit and 2-Digit Factors

Answer Key for Fill in the Blanks:

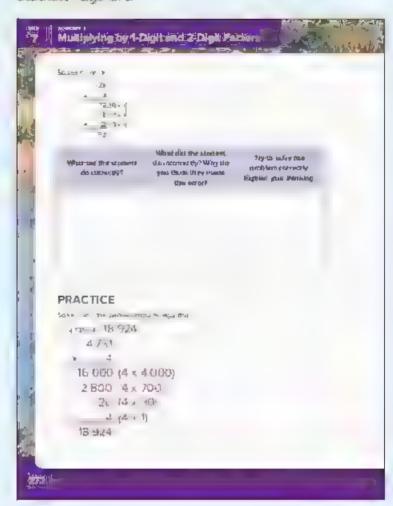
CONNECT (7 min)



Error Analysis

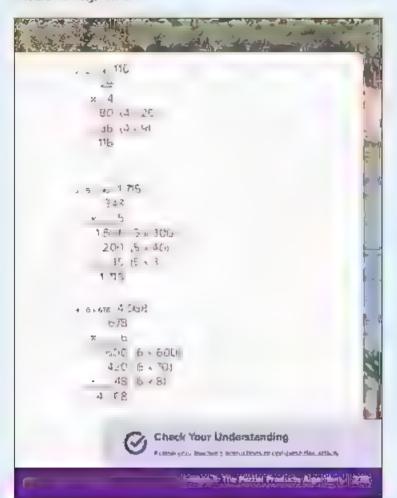
Ask students to turn to Lessen 3 CCANECT Emar Analysis to complete the error analysis activity. The students are the muticity each gamber by 4, but the patent step to the 20 are a 1 months of 1 and 1 months and 1 months are students.

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Student Page 273



WRAP-UP (3 min)

Let's Chat About Our Learning

Ask students to reflect on why they think this algorithm is called "partia, products."

the argument against the "they" is "to this original product.

PRACTICE

Direct students to Lesson 3 PRACTICE and have them complete the problems. Address student-errors and misconceptions.

Check Your Understanding

Sowe using the partial products algorithm. Show your work

$$4 \times 476 = 1,904$$

So ve using any method. Show your walk

$$3. 301 \times 3 - 903$$

LESSON 4 The Standard Multiplication Algorithm

Lesson Overview

rethis lesson, students are introduced to the standard a gorithm for multiplication. They connect the steps of the standard algorithm with what they have previously learned about area modes and the partial product adorthm.

Lesson Essential Questions

- How can we use our know edge of prace value to multiply and divide more efficiently?
- Mow can we use different strategies to help us independent digit must preaton and division?

Learning Objective

In this lesson

- Students wile estimate products of truttidiging.
 In life cation problems
- Students will use the standard algorithm to multiply a one-digit number by a whole number with up to four uligits

Grade-Level Standards

- **4.A.2.b** Multiply a whole number of up to four digits by arone-digit whole riumber us hig strategies based on place value and the properties of operations
- **4.C.1.** Assess the reasonableness of answers using menta computation and eathmation strategies rolleding rounding



Vocabulary Check-in

standard algorithm, Distributive Property of Multipication, area model, partial products



Materials List

No additions mater as needed



Preparation

thip additions, preparation needed

DIGITAL



Lesson 4

The Standard Multiplication Algorithm



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510





Student Page 274



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

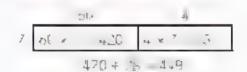
Students sometimes have difficulty demonstrating
proper regrouping when using the standard
a gorithm for multiplication. They may omit
writing the digit above the correct place or they
may attempt to place two digits at a time in the
product.

Similarities in Models

- 1 Direct students to Lesson A ACCESS Similar ties in Mode's Asi, students to estimate the products of the two problems. Remind students that rounding is one way to estimate.
- Spiriting class in half to solve the problem. Assign half of the class to solve the two problems with an area mode and half of the class to solve the two problems using part all products. Encourage students to work together and to agree on an answer
- 3. Ask a student in each group to record their work on the board and compare their answers with the estimates Both estimates will be low because they rounded down. Students will refer to this a jain later in the lesson.

Answer Key for Similarities in Models:

ी निष्या विल्लामा अस्ति ए रहे असी



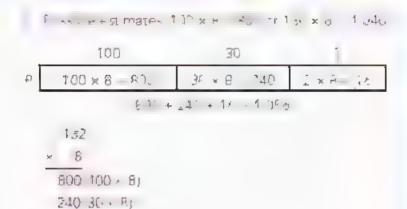
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Lesson 4 - The Standard Multiplication Algorithm



CONCEPT

Multiplying by 1-Digit and 2-Digit Factors



BUILD (40 min)

- 16(2×8)

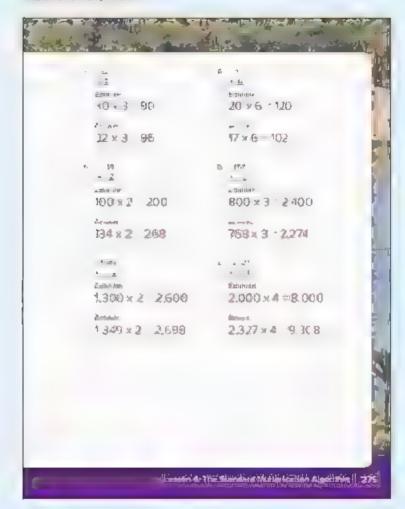
1 358



Using the Standard Algorithm

- 1. Explain to students that today they will be learning the standard algorithm for multiplication. The strategies they have been using are effective and with help them find the correct product, but they can take a long time to ap ve. The standard a gorithm is the most efficient strategy for multiplication. Assure students they may continue to use the strategies they are comfortable with while they are practicing the standard algorithm. Students are tikely to need additional practice to paster this still.
- 2 Write 64 x 7 vertically on the board. Remind students that since they aready know the correct product, they can focus on making connections as they watch the steps of the standard a gorithm.
- 2 Mode, using the standard algorithm to so ve 64 x 7 Students should refer to the area mode, to answer the multiplication
 - Une up the numbers vertically with the larger number on top
 - Point out to students where the Ones and Tens places are
 - Startim_ltip://mg the Ones place (7 Ones x 4 Ones = 28 Ones)
 - Explain to students that since 28 Ones is 2 Tens and 8 Ones, they will need to regroup unit as with addition and subtraction, regrouping with multiplication is when they group 10 Ones into 1 Ten. In this case, put the 8 Ones beneath

PRINT





the line in the Ones place, but the 2 Tens will go above 6 in the Tens place. This means they regrouped 20 Ones for 2 Tens

- . Next, mu tiply the Tens & Ones x 6 Tens 42 Tens)
- Explain to students that they need to add the 2 Tens from the previol sistep (42 Jens + 2 Tens 44 Tens)
- Explain to students that since 44 Tens is 4 municipeds and 4 Tens they will need to regroup. And the 4 Tens beneath the line in the Tens prace then write the 4 municipeds in the Humbreds place.
- Read the problem with the product to students $64 \times 7 = 448$ Ask students if this matches what they got when solving with the other two strategies

- 4. Ask students to their about the similarities between the standard a gondom and the area model and the partial products algorithm as they topy your work into their Student Edition. A low students to share their thanking with their Shoulder Partiner
- 5. Next, mosel using the standard algorithm to some 132 x 8. Again, remind students that they already know the correct product, so they can focus on making connect or size they watch the steps of the standard algorithm. Use the following steps as you mode. Students should refer to the area mode to answer the multiplication.
 - in Line up the numbers vertically with the larger number on top
 - b Start muniplying the Ones (8 Ones × 2 Ones × 16 Ones)
 - Write the digit 6 in the Ories place underheath the line. Write the digit 1 representing 1 Ten above the digit 3. Remind students that this is called regrouping.
 - d Next ray Lpsy the Ters (8 Ones * 3 Ters = 24 Tens)
 - e Add 1 Ten (from the previous step) to 24 Tens to get 25 Tens. Write the digit 5 in the Tens place underweath the line Regroup by writing the digit 2 representing 2 Hundreds above the digit 2 in the Hundreds place.
 - f Finally multiply the Hundreds (8 Ones x 1 Hundreds 18 Hundreds)
 - g Add 2 Hundreds (from the previous step) plus 8 Hundreds to get 10 Hundreds Rem idistudents that 10 Hundreds is 1 Thousand Write 0 in the Hundreds place and 1 in the Thousands place underneath the line.

- 8 50 - 1030 1,05e

Lesson 4 - The Standard Multiplication Algorithm

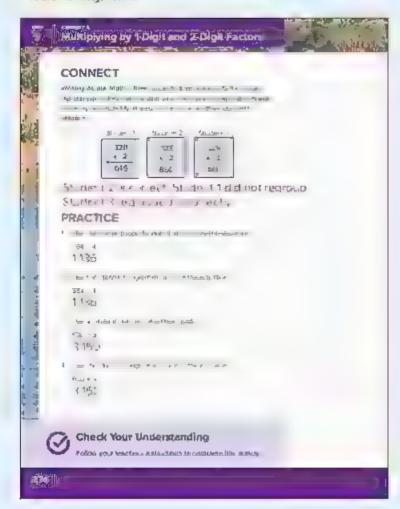
7 Multiplying by 1-Digit and 2-Digit Factors

- Ask sturients to think about the similar ties between the standard a gorithm and the area model and the partial products algorithm while they copy the problem in Lesson 4 Bull Dilstog the Standard Algorithm. Allow students to share their thinking with their Shoulder Partner
- Instruct students to estimate before trying to solve the rest of the problems using the star dail anguithm. Remind them to compare their answers with their estimates. If it is derivative difficulty petting started, encourage them to use another strategy to that to be pittern find the correct answer using the standard argo; thin Note that it is not important that students estimate the same way, but they should get the same answer using the standard argorithm.
- 8. As students are working, circulate around the room. If students are struggling, work through a few of the problems together on the board. After students finish, ask students to share out answers and discuss how they used the standard algorithm to so ve





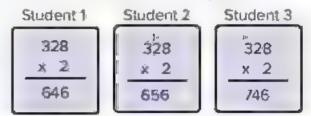
Student Page 276



CONNECT (7 min)

Writing About Math

1 Ask students to turn to Lesson 4 CONNECT Writing About Math and respond to the prompt



WRAP-UP (3 min)

Let's Chat About Our Learning

Ask students to space their ingering questions related to the standard a gor thin. Encourage students to answer each other's questions when piessible.

PRACTICE

Direct students to Lesson 4 PRACTICE and have them complete the propierris. Address all dent errors and misconcept ons

Check Your Understanding

1 Solve 471 x 3 using partial product or alea model



2 So ve 471 x 3 using standard a gorithm

LESSON 5 Review Connecting Strategies

Lesson Overview

in this essen, students continue to build fluency using the standard a gerithm for multiplication.

Lesson Essential Questions

- "how can we use out knowledge of place value to multiply and a vide more efficiently?
- How-can we use different strategies to help us understand murtipligit multiplication and division?

Learning Objective

in this lesson

Students will use the standard algorithm to multiply
a cried of number by a whole number with up to
four did ts

Grade-Level Standards

4.A.2.b Muttiply a who shumber of up to four digits by a one-digit whose humber using strategies based on place value and the properties of operations



Vocabulary Check-in

Review vocabulary as needed.



Materials List

- Limit 7 Lesson 5 Marching the Models Cards
 Sets A. B. and C [1 set per seudent)
- Scissors



Preparation

Photocopy the Black he Master at the end of the volume. Students will work in groups of three Each students in the group will get a different set of cards.

DIGITAL



Lesson S

Review Connecting Strategies



OL or Code egmt4036



Student Page 277



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

Students sometimes have difficulty demonstrating
proper regrouping when using the standard
a gorithm for multiplication. They may forget to
receit their regrouped digit or attempt to prace
two piglits in the product at once.

Can You Spot It?

f. Direct students to Lesson S. ACCESS Can You Spote 10 and ask students to read the problem, answer the question, and write their own explanation for regrouping.

> 1,532 x 4 6,128

2 As vounteers to stare their expanations with the whole group Clear uplany it scenceptions

Answer Key for Can You Spot It?

a redit கூர அறையூக்கு கோது Thomasonds . area Exp இதா நெல்ல ar, நிறுகுகுகு உடும் செல்று இது கொதிருந்து நிறுக்கு ஆருத்துக்கு நிலுக்கத்திர் இது அந்த

Lesson 5 - Review Connecting Strategies

BUILD (40 min)



Matching the Models (30 ma)

- Assign students into groups of 3
- 2 Distribute sets of cards to each group. One student should receive Set A. one should receive Set B. and one should receive Set C. Have students but out their cards and keep them separate from the other students' cards in their group.
- 3 To play the game, one student plays a card and the other students find the matching cards in their sat
- 4. Once students have a match, they should review the steps for solving the problem using the sten tard algorithm and discuss where they see regrouping in the problem.
- 5. Students continue to pray until no cards remain.

à if time remains, students can create their own matching cards to display in the classroom

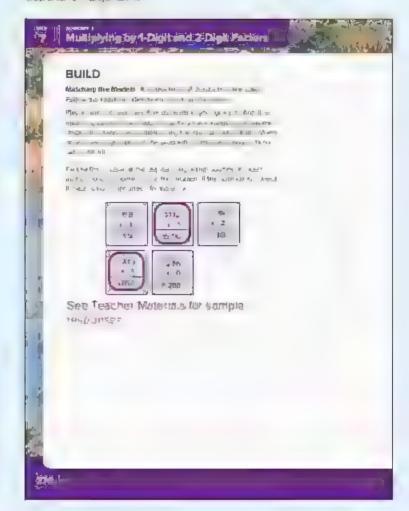
Fix the Error (10 mun)

 Direct students to Lesson 5 Build Fix the Error Ask students to look for errors in using the standard a gerithm. If the problem is solved incorrectly, students must fix the error

Answer Key for Fix the Error:

- 1 158 x 3 154 simply feet it dent 12 fort Eigenst weet modification feet place
- · _ 1+3×5 1. 1. · #r+ *
- 3 Ye x 2 = > s ic met ∏ estabert 1 of e yramp ata
- 4 41, x 1 = 1 % c med

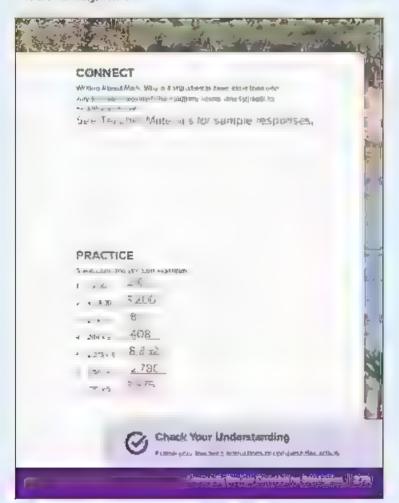
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CONNECT (7 min)

Writing About Math

Ask students to turn to Lesson 5 CONNEC Withd About Math and respond to the prompt

WRAP-UP (3 min)

Let's Chat About Our Learning

Ask valunteers to share their responses, with the classic Paterer astory at dumate assura - Tell service strate yet are thing in bioleman than the the active affected atemptical, etatuox, they ना उपन त प्रामिद्दान दोगा व तर । वट्रीम का प्रामित े और किए के प्रकारित के प्रकार का का किए के प्रकार के किए किए किए कि are prature in a new strategy.

PRACTICE

Direct students to Lesson 5 PRACTICE and have them complete the problems. Address student errors and m sconceptions

Check Your Understanding

Sowe-the-problems using the standard algorithm

- 1 74 × 2 = 148
- 2 122 × 4 483
- 3 4/2 x 5 3 min
- 4 383 × 2 1 7 · ·
- 5 1074 x 3 = 3,22

ロカがを続ける01 ・ 。 and chitchnologist and ovid-

Lesson 5 - Review Connecting Strategies

LESSON 6 Two-Digit Multiplication

Lesson Overview

In this essen, students use the Distributive Property to Implify a two-digit remoter by a multiple of 10.

Lesson Essential Question

 How can we use our know edge of prace value to multiply and divide more efficiently?

Learning Objectives

in this lesson

- Students will dentify patterns when multiplying two multiples of 10.
- Students win the tiply atwo-digit number by a multiple of 10.
- Students will assess the reasonableness of an abover using estimation and mental math

Grade-Level Standards

- 4.A.2.c Multiply two two-d githly thoms, with and without regrouping, using strategies based on place value and the properties of operations
- **4.A.2.** Illustrate and explain calculations using equations or models.
- **4.C.1.•** Assess the reasonableness of answers using mental computation and estimation strategies including rounding



Vocabulary Check-in

Distributive Property of Multiplication



Materials List

No additions mater as needed



Preparation

No additions, preparation necued-

DIGITAL



Lesson é

Two-Digit Multiplication



Quick Code: egrm≠037

520



Student Page 280



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

Students they have difficulty determining the
murpher of zeros three product when multiplying by
multiples of 10, especially when the product of
the basic factionds in zero. For example, students
may thrink that 80 = 50 - 400 rather than 4,000

Mental Math

- 1. Ask students to turn to Lesson & ACCESS Menta-Math and forlow along as you read the problems aloud. For each problem, ask students to identify which arrayer is reasonable and to explain now they know
 - s 56 × 4 c.oser to 200 or c.oser to 2,000? 21
 - .s 156 × 4 closer to 500 or closer to 5,000? [)0
- Write each of the following problems or the board one at a time. As a students to try to solve them mentally without pend, and paper. Students may have the rhands or give another signal when they have an answer.
 - · 32 · 3 | w
 - 232 × 3 + 1 × 5
 - 71 + 5 TRT
 - 371 x 5 = 1 25;

Multiplying by 1-Digit and 2-Digit Factors

BUILD (40 min)



Ten Times (10 m.m)

- i. Ask students to share with their Shoulder Partner what a multiple of 10 is
- 2 Direct students to Lesson 6 BUILD Ten Times
- 3. Ask students to make a presistion about what will happen when two multiples of 10 are multipled together
- 4. Ask students to share their predictions. Make sure the students see that each product will have at least two seless.
- 5 Complete the rest of the problems together. He p students identify the basic fact and place two zeros at the end of the product.

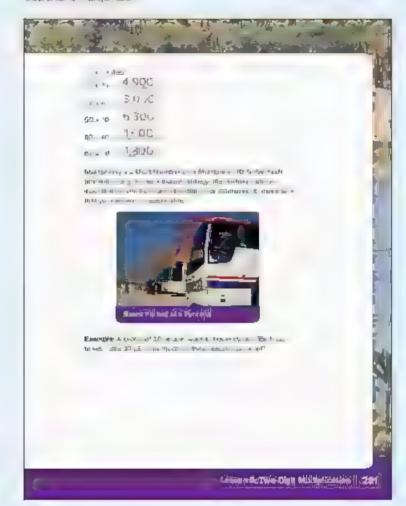
Answer Key for Ten Times:

- $1. 39 \cdot 59 = 1500$
- 2 20 × 90 1,500
- 3 70 70 = 4 90."
- 4 50 × 60 3 000
- F 4(" , 77" , 2) ("
- .6 ±(··1 ± 1,500

Multiplying a 2-Digit Number by a Multiple of 10 (30 mm)

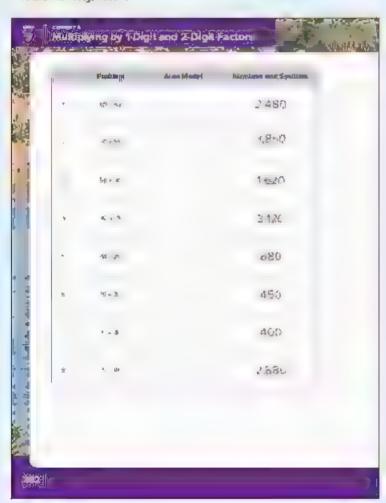
- As students to recal the different strategies that they have learned for multiplying numbers so far the area model, the part a products algorithm, and the standard algorithm Remand students that numbers can be decomposed when multiplying because of the Distributive Property of Multiplication. Share with students that they will use all of these strategies again as they learn to multiply two 2-stight numbers.
- 2 Ask students to turn to sesson & Multiplying a Two-Digit Number by a Multiple of 10. Ask a volunteer to feed the problem aloud Model sowing 38 × 30 using an area mode. First, ask students to help you decompose 30 according to the value of each of its digits (30 + 8) Explain that since 30 is a multiple

PRINT





Student Page 282



of 10, that it does not need to be decomposed because they just identified some patterns for working with multiples of 10.

	30	8
30	30 x 30 ≠ 900	30 x 8 = 240

 Mode recording the calculations used in the area mode with numbers and symbols. Ask students to record your work in their Student Egition

- 4 Ask students if they have any questions. Clear up in sconcept onside before moving on
- 5. Direct students to Lesson 6 Bull.D Multiplying a Two-Digit Number by a Multiple of 10 and ask them to complete the applitional problems with a partner

CONNECT (7 min)



Error Analysis

Direct students to Lesson & CONNECT Error Analysis arrel ask to read the directions. Give students time to respond to the prompt

WRAP-UP (3 min)



Let's Chat About Our Learning

Ask students to discuss now they used patterns when multiply no by 10s to solve the multiplication problems more efficiently.

PRACTICE

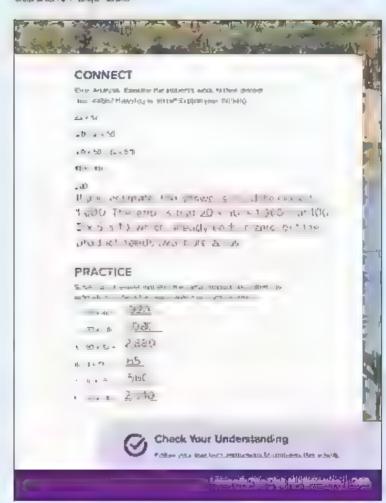
Direct students to Lesson & PRACTICE and have them -complete the problems. Address student errors and misconcept ons

Check Your Understanding

Solve using the area mode or the partial products algorithm. Use astimation to check the reasonab eness of your answers

60 × 73 - 4,380	ំ ទោក្សាស្រ្	- 1 (or d +
$30 \times 70 = 2.100$	ቸ‴ ነ⇔∸ † "ኮሥር ⊀ *	1 0
4 × 532 2 128	Plante EST Table 4。F1	L ¹ U
30 × 54 = 1,620	f < 5 5 5 5 5 1 1 1	510
82 × 40 = 3,280	Fishershire BO - 40 o	21,

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Materials List

- Light 7 Lesson 7 Area Model Gards (order set per student)
- Selesers
- 16iue sticks



Preparation

Photocopy the Backine Master at the end of the volume.

DIGITAL



Lerson 7

Area Models and Two-Digit Multiplication



egimt#038

LESSON 7 Area Models and Two-Digit Multiplication

Lesson Overview

in this lesson, students extend their understanding of the area model of multiplication and create area models to represent two-dust by two-dust multiplication

Lesson Essential Questions

- How can we use our knowledge of place value to mustiply and divide more efficiently?
- How can we use different strategies to he prus understand multipligit multiplication and division?

Learning Objective

in this lesson

 Students will be able to use the area mode to so ve two-digit by two-digit multiplication problems

Grade-Level Standards

4.A.2.c Multiply!two.two-digit.numbers, with and without regrouping jusing strategies based on place value and the properties of operations.

4.A.2.e strate and explain calls at ons using equations of modes.



Vocabulary Check-in

Review wocabulary as needed

Lasson 7 - Area Models and Two Digit Multiplication

ACCESS (5 min)



COMMON MISSERVE, THE LARGE ERRORS

- Students may requestly decompose the factors
 in the placement making it difficult for them to use
 the multiples of 10 to so we disproblem.
- Students may not multiply the conect numbers together, giving them an incorrect product.

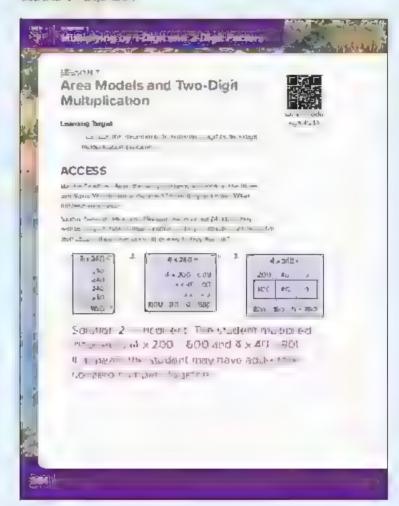
Be the Teacher

- Direct students to Lesson 7 ACCESS Be the Teacher. Go over the directions with students and have them work independently to identify which problem does not be ong
- 2 After two minutes, ask students to share their thinking with a partiel Encourage students to listen terminal particularly if they selected a fierent sollingue.
- 3 Ask volunteers to share their thinking with the class

Answer Key for Be the Teacher:

「Attains in Mert Test, Attail, entry it ext Confirmation 可以entry entry item
May Asset a 12 min 12

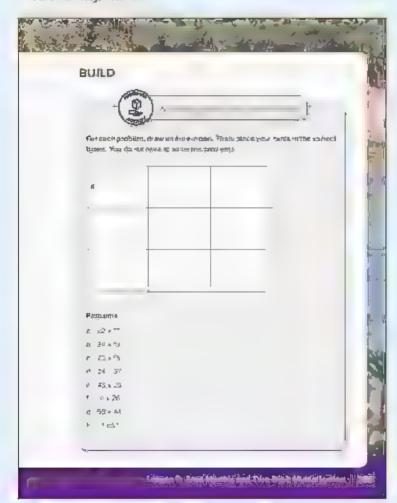
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Student Page 285



BUILD (45 min)



Working with the Area Model

- 1 Direct students to Lesson 7 Bull D Working with the Area Mode. Ask students to draw an area mode for 22 × 17. They do not have to solve the problem.
- 2 Remind students that they warked on multiplying two digit numbers during the previous lesson. As when to think about how their area model might be different if they were multiplying 22 × 17
- 3) Ask a few students to share their deas
- 4. Distribute a set of Area Mode Cards to each student. Give them time to cut the cards apart.
- The students they will use the number cards to create an area mode for 22 of 7. As istudents to dentify the four cards they think they should use to create the larea mode. (1), and Assistance to share they reason no
- 6. Ask students to place the number cards on the mat to create an area model for the multiplication problems
- Ask you inteers to share where they put their gards. Confirm that students have placed their cards in one of these formations and have them glue down their cards. Explain that, both arrangements are correct but the products in the boxes will be indifferent places, so they have to make sure they are recording and checking their products carefully.

1	15	2
ε,		

X	10	7
- `		

8. Mode for students how to use this mode to multiply For the purpose of this example implify 20 × 10, 2 × 10, 20 × 7, and 2 × 7 and record each product. However, emphasize to students that the order in which they so we the partial products does not matter. They can begin anywhere

A	2¢	2
1:)	2.1
7	1 1	1:1

K	10	J
20	4	140
2		14

Leacon . Area Models and Two Digit Multiplication

174



Multiplying by 1-Digit and 2-Digit Factors

- 9. Ask students how they think they would get the product for the whole problem? If everust add as fithe partial products together
- 10 Give students time to and the partial products 200 + 140 + 20 + 14). Ask volunteens to share than answers for Problem 1
- 11 Students should work with a partner to complete Problems 2 and 3
- 12 Once students are finished, they should continue to work on the remaining problems. They can choose to continue working with their partner of they can work ndependently

Answer Key for Working with the Area Model:

- 1 . 1 . 17 414
- 34 12 640
- 1 1 1 1 / ST
- E 45 / 20 KOF
- t els 1t 1 [85
- EF A HH DEF.
- ስ የዲነ ። ችነሮነ

CONNECT (7 min)

Writing About Math

Direct students to Lesson 7 CONNECT Writing About Math and ask them to answer the question

Answer Key for Writing About Math:

Students should note that puth factors are terms sed. Students thay gotice that numbers at. Fact, P. torre F = 5 more, th 22 x 17, 20 s ruth elyl arterajamby 7

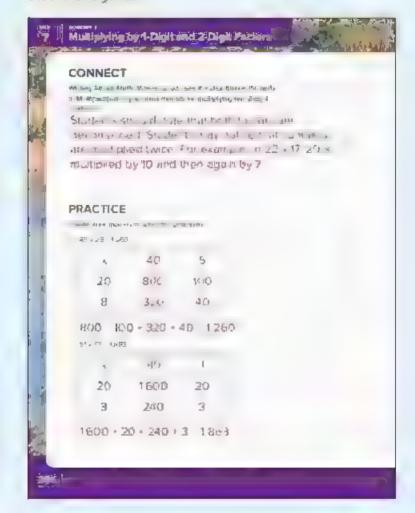
WRAP-UP (3 min)



Let's Chat About Our Learning

Ask students to share their thinking with a partner After students have had time to talk, ask vounteers to share their deas with the class

PRINT





Student Page 287



PRACTICE

Direct students to Lesson FPRACTICE and have them complete the problems. Address studentierrors and impropertions

Check Your Understanding

Sowe each problem,

1 17 × 43 = 31

	1	4
4.	40	~
3	36	21

2 30 x 31 - 1 (419

(30	4
.+	110	-7
	-{1 +	3

3 50 × 42 210

	<u>-</u> 1.	er e
4.	h	III
Ł	10	1141

Invite har Ita

4 The beaustare ordered 34 boxes of a new book. There were 24 books in each box, how many copies of the book did they raceive.

	35,	4
- 1st	1.1	ed 3
4	1 1	-

LESSON 8 Algorithms and Two-Digit Multiplication

Lesson Overview

mithis lesson, students make connections between area models, the partial products algorithm, and the standard alignithm for two-digit multiplication. Maxing these commentación helps students buille despiuniterstanding of multipleation processes. Students use three strategies to solve two-digit by two-digit multiplication problems

Lesson Essential Questions

- How can we use our knowledde of mace value to multiply and divide impre efficiently?
- . How can we use different strategies to help us understand multipligit multiplication and division?

Learning Objective

in this lesson

 Students will apply a variety of strategies to solve twe-eligit by twe-eligit multiplication problems

Grade-Level Standards

4.A.2.c Multiply two two-d githumbers, with and without regrouping, us no strategies based on place valle and the properties of operations

4.C.1. Assess the reasonableness of answers using mental computation and estimation strategies including លេខភាជាកាឡា



Vocabulary Check-in

Review vocabulary as needed.



Materials List

No additions mater as needed



Preparation

No additions, preparation needed-

DIGITAL



Algorithms and Two-Digit Multiplication



egmt4039

530



Student Page 288



ACCESS (5 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students thay have difficulty decomposing muribers when a problem is written vertically.
- Students may have a hard time keeping track of the partial products and how to distribute the numbers properly

Just the Facts

- 1. Ask students the following question
 - How have we used patterns and relationships to their use that engine matternatics?
- 2 Have students think quietly about the question and quickly record their thinking. Then, as, then to share their thinking with their Shoulder Pattner Finally, ask volunteers to share their thinking with the class.

BUILD (45 min)



From Area Model to Partial Products

CO THE

- Direct standards to Lesson 8 Build From Area Mode's to Partial Products and ask students to estimate the product of 53 × 28. Remind students that rounding is a common way to estimate. If students round the factors to 50 and 30, their estimate is 1,500.
- 2. Ask students to solve the problem using an area mode. Encourage students to compare their answer with their estimate, then they might have made a mistake multiplying.

	50	3
20	1,000	6.4
8	4	14

.000 + n0 + 400 + 2 - - 1 - Ru

Larger & Algerithms and live Digit Multiplication



LONGS.

Multiplying by 1-Digit and 2-Digit Factors

- Share with students that today they will solve twodigit by two-digit multiplication problems using the partial products algorithm
- 4 Ask students to predict now many partia products will result from a two-digit by two-digit multiplication problem

변 . . 는 3m5차 중대 하는는 b al Se 전 설명을 해 됩니다.

5 Mode, for students how to set up the partial products algorithm. Excourage them to refer to the area mode! for help with the answers. Remind students that these calculations can be done in any order.

53 x 28 (3 × 3) (50 × 3 (3 × 20) - (50 × 20)

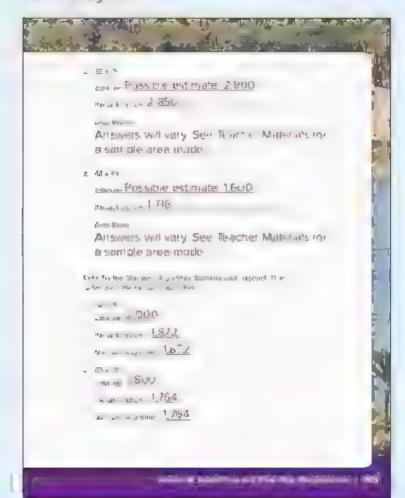
& Ask students to complete the partial products and so ve the problem

400 (50× 8) 60 (3× 20) - 1.0(2) (50 × 20) 1484

7 Ask students to help you so ve Problems 2 and 3. first estimating and then solving using the partial products a gorithm

Answer Key for From Area Model to Partial Products:

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Student Page 290



Let's Try the Standard Algorithm (25 min)

- Remind students that although they have been earning different strategies for thut plication, mathematicans work towards being efficient in their calculations. It might take a long time to draw an area mode to so we a problem, so they may thoose to use an algorithm. We part a products or the standard algorithm.
- 2. Direct students to Lesson 8 Let's Try the Standard A gorithm. Ask students to first estimate the product of 52 × 35, and then solve the proplem using partial products. Estimate 50 × 40 ÷ 2,600

 Mode solving the problem using the standard algorithm. A ow students to copy the steps after you have finished

- As students to discuss now the partial product problem and the standard algorithm problem connect to each other
 - The first the is a communation of two littles and a products it is the same as not Subject to x
 I + 1 x 5
 - The expression of the same at - 5 Guide students through the rest of the propiems Remind students to compare their answers to their estimates. Encourage students to draw area mode s or use the partial products algorithm to be pithem if necessary.

Answer Key for Let's Try the Standard Algorithm:

- 1 51 35 1842
- 1 70 70 1 74 Est 1 step 1 4 G
- 3 46 · 25 = 1,150 Estimate | 5 3
- 4 (1 ← 24 × 2 × 14) Estimate 2 印。
- F (4 5" 1 Red Erfimate 1 = 1
- A Compact Figure 91

CONNECT (7 min)

Writing About Math

Direct stydents to Lesson & CONNECT Writing About Math and ask 對em to respond to the prompt

WRAP-UP (3 min)

Let's Chat About Our Learning

Ask students to share their thinking and their reasoning Encourage students to ask each other questions and to offer each other nero.

PRACTICE

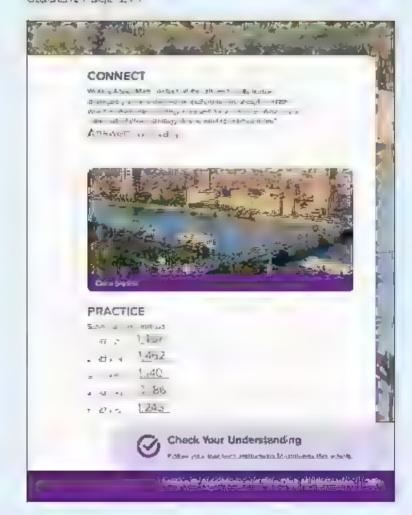
Direct students to Lesson & PRACTICE and have them complete the problems. Address student errors and misconceptions

Check Your Understanding

So ve using any method

- 1 48 x 7 1 124
- T C. A TA . . . CO
- 14x 1 410
- 4 62 x 1a 404
- [44 8 22 | 3 127

PRINT









Materials List

 Upit 7 Lesson & Story Problem Cards (1 card per student)



Preparation

Photocopy the Blackline Waster at the end of the

DIGITAL



Putting It All Together



egint4040

LESSON 9 Putting It All Together

Lesson Overview

In this lesson, students use addition, subtraction, multiplication, or a combination of operations to solve story problems

Lesson Essential Question

 How do we the math to help us understand and so we real-world problems?

Learning Objectives

In this lesson

- Students we apply the Three Reads strategy to analyze and solve story problems
- Students will add, subtract, or multiply to solve-story problems

Grade-Level Standards

4.A.2 Use place value understanding and properties of operations to perform multi-digit arithmetic

4.C.1.d Solve mult step word problems posed with whole gambers using the four operations, including problems in which remainders must be interpreted



Vocabulary Check-in

Review vocabulary as needed

Laston 9 . Putting It All Together

ACCESS (5 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students may so we part of a problem and think
 they are figured using strategies to thoroughly
 understand what is rappearing in a problem
 before sewing 6 an important step in the
 problem solving process
- Students who talk on key words may infinite present what is happening in the problem. Using teywords in confext is helpful in problem so.ving. but they are not a fee proof so ution strategy.

Number Talk

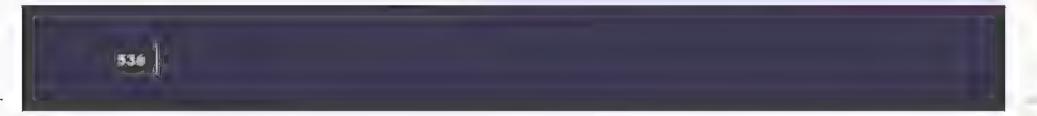
- 1. Diffect students to Lesson 9 ACCESS Number fack Ask students to use any strategy to sowe the multiplication problem.
- 2 Ask students to share their answers. Record a answers, including the hoomest ones
- I fingage students in a conversation about the answers. Use thermas an opportunity to promote discussion about misconceptions and errors. Remind students that they are still feaming and analyzing arters is a very effective way to learn

Answer Key for Number Talk:

1 34×89 (1)

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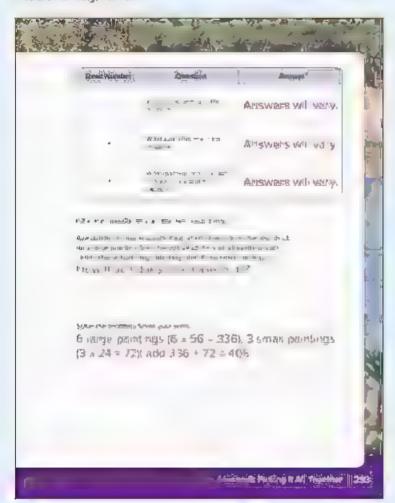








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BUILD (45 min)



Three Reads (15 m.n)

- 1 Direct students to the first story problem in Lesson 9 BJLD Three Reads. Ask students to follow eveng while you read the problem a oud
- Ask students what is happening in the problem. Students should record their thinking.
- 3. For the second read, choral read the problem with the entire mass. Ask the students what quantities they observe in the problem. Students should record their thinking.
- A For the third read, ask students to read the problem with a partner
- 5. Ask students what mathematical questions they only disarrabout this situation. Students should record their questions.
- 6. Revea to students the actual question for the story problemand ask them to write the question in the plank. How many pounds did Aya make mail?
- 7. Ask students to work with a partner to show how they would organize the information in the problem and some. Tell students there are multiple steps to solving this story problem.
- 8 Call on students to share their answers
- 9 Ask students to work with a partner to solve Problem 2 using the Three Reads strategy. Go over the answer with students

Answer Key for Three Reads:

- 1 6 ange palatings a size of and 3 small paintings a size of 11 size # 72 = 408 LE
- z in the restay allow a = 420 mg Friday for re-

Lesson 9 . Putting It All Together

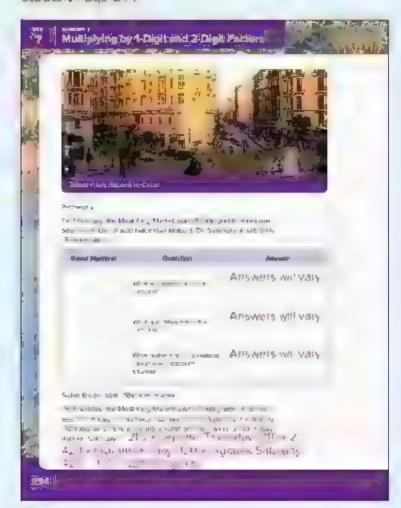
Story Problem Match (30 m 1)

- 1 Distribute the session 9 Story Problem Cards Give each student (or pair of squidents) one card.
- 2 Ask students to read their card, and their try to find the student who has the soul, on steps or story problem that matches
- if time allows, so lect a cards and red strought them so students can complete the activity again
- 5. At the end of BUILD, go over all of the answers with students

Answer Key for Story Problem Match:

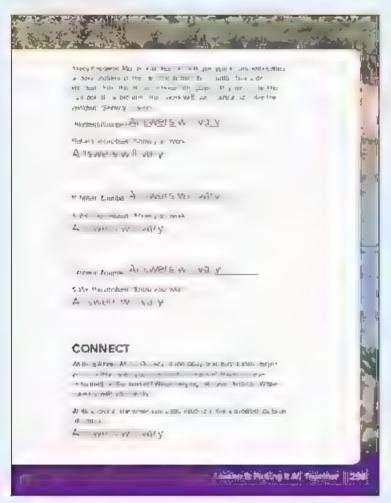
- The to offer
- ் 1 நீத் தொருக்கும்.
- < 30°5 % 1 1.
- 4 IT THICAT WESTERNIS
- F + 23 47 3
- 1 4 1 45
- · soft meter
- 용 의동인 학생이 하다.

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Student Page 295



CONNECT (7 min)



Writing About Math

Direct students to Lesson 9 CONNECT Wating About Math and as it emito respond to the prompt.

WRAP-UP (3 min)



Let's Chat About Our Learning

Ask vomitteers to share their responses to the Writing About Math prompt.

Lasson 9 - Putting It All Together

7 Multiplying by 1-Digit and 2-Digit Factors

PRACTICE

Direct students to Lesson 9 PRACTICE and have them complete the problems. Address student errors and this conceptions

Check Your Understanding

So we using any method

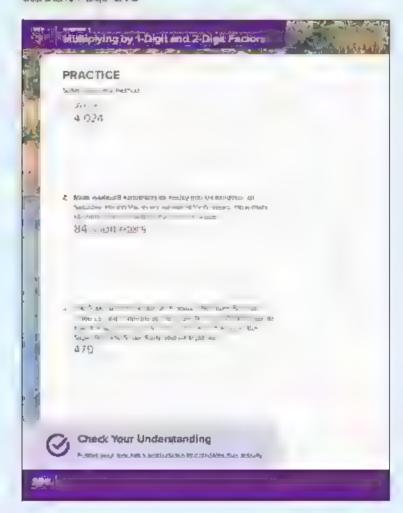
- I mamed uses 3. eliministo make 1 pitchet of emonade the makes 15 pitchets thou many lemons does he use allitogether?

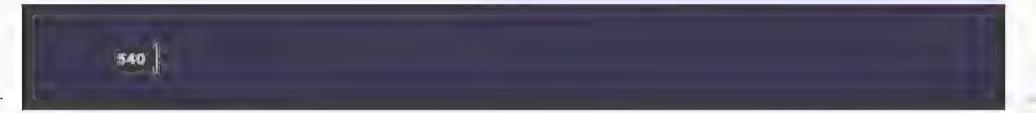
 3 × 15 = 45 terrons
- 2 A teacher bought I packs of pencils. Four of the packs had 20 pencils and the other 3 packs had 12 pencils. How many pencils did the teacher have mail?

 20 × 40 + (3 × 10, = 30 + 31)
- 3 45 × 12 = 540

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Still dent Page 296











Materials List

Materials thay vary



Preparation

No additional preparation needed

DIGITAL



Concept Check-In and Remediation



egirit4041

Concept Check-In and Remediation

Lesson Overview

In this lesson students work to connectum sconceptions and errors from Concept it Multiplying by One-Digit and Two-Digit Factors. First ladminister the Concept Check in Once you have reviewed the quilibraries. Choose remediation activities based on the needs of your students. Some recommendations are listed below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or in a small group with the teacher

Concept Essential Questions

- How can the relationship between multiplication and division be used to sowe problems?
- How can we use our knowledge of place value to mustiply and divide more efficiently?
- how can we use different strategies to help us understand thurst ignimation teation and division?
- Höw do we use thath to help us understand and solve readword prodiems?

Learning Objective

In this lesson

 Students will work to correct misconcept ons and errors related to multiplying by one-digit and twodigit factors

Concept Check-in and Remediation

Grade-Level Standards

- 4.A.2 Use place value understanding and properties of operations to perform multi-digit arithmet c
- 4.4.2.b Multiply a whole number of libits four digits by a one-digit whole number using strategies based on place value and the properties of operations
- 4.A.2.e Multiply two two-digit numbers, with and without regrouping, using strate ties based on place value and the properties of operations
- 4.A.2. Thustrate and explain calculations using equations of models
- 4.C.1.d So we multistep want problems pased with whole numbers using the four operations, including problems in which remainders must be interpreted
- 4.C.1.4 Assess the reasonab eights of answers using mental computation and estimation strategies including rounding



Vocabulary Check-In

Review concept vocabulary as needed.

THE REPORT OF THE PROPERTY OF

- While there are multiple ways to descripose almorpher, municipalshould be: decomposed using place value when multiplying
- Students may incorrectly decompose the factors according to their digits rather than according to the value of their digits
- Students may have difficulty distermining the number of zeros in a product viven multiplying by multiples of 10, especially when the product of the basic fact ends in zaro Students sometimes have difficulty demonstrating proper regrouping when using the standard algorithm for molaplication. They may forget to record their regrouped digit or attempt to place two digits in the product at once.
- Students may have a hard time keeping track of the partial products and how to distribute the numbers properly.



H...

Students are not able to recognize patterns with zeros when multiplying by a multiple of 10, 100, and 1,000.

Then

Review Unit & Lesson 7 and Unit 7 Lesson 6. Consider engaging students in handson practice where they high light the basic fact and place a check mark over each zero in the factors as they write a zero in the product

 $3 \times 400 = 1,200$ $60 \times 70 = 4,200$

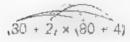
Her

Students struggle to multiply after decomposing factors:

Then...

Review Lessons 2 and 8 Consider angaging students hands-on practice where they use different colors to represent multiplying different sets of factors

32 × 24



2400 + 120 + 160 + 8

H...

Students get confused about what to multiply when the problem is presented vertically

Then...

Review Lasson 8 Engage students in additional hands-on practice where they circle the numbers they are multiplying using different colors. Also, have students practice solving vertical problems alongs the arrangements alongs the arrangements between the two approaches.

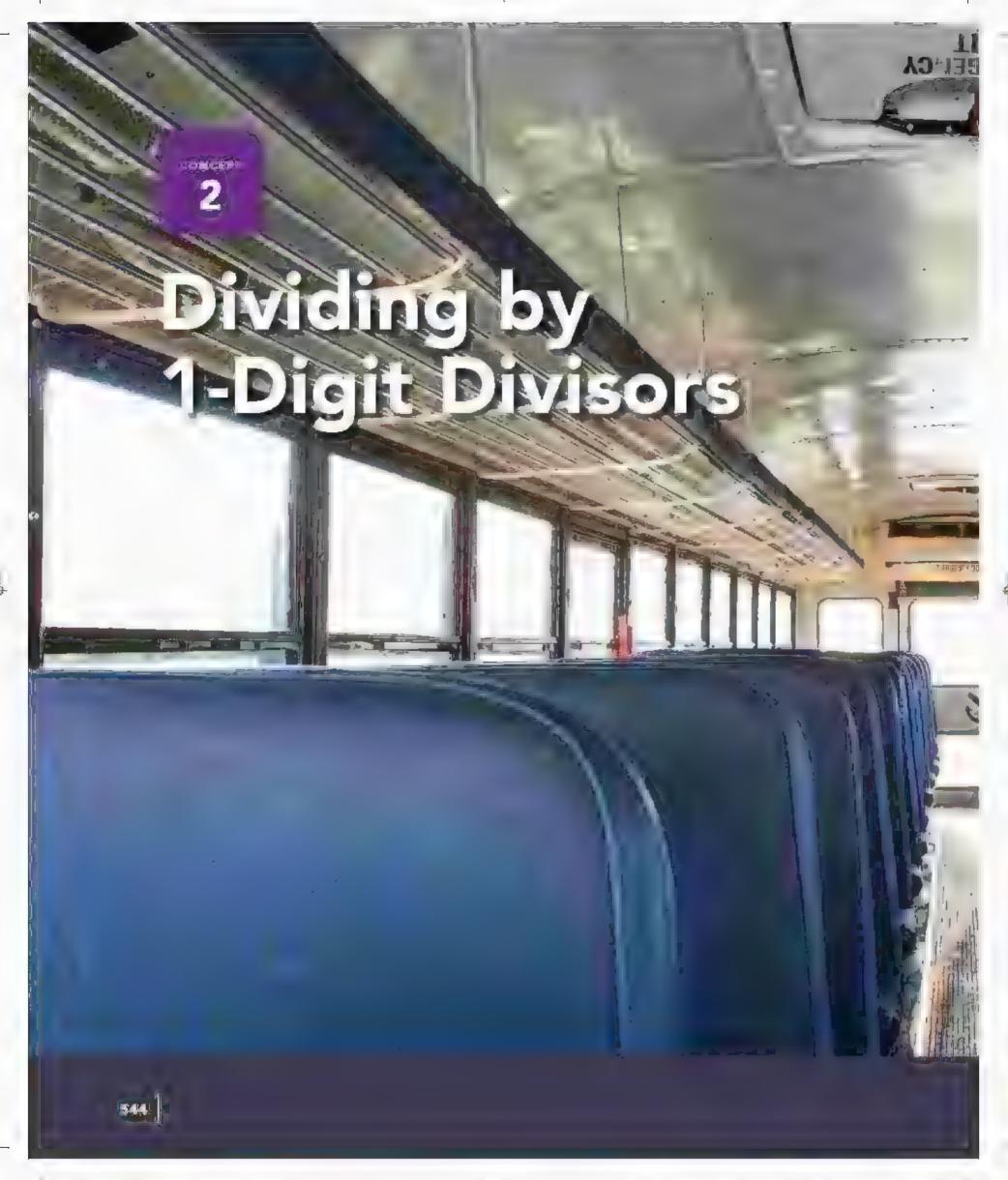


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80.17

Concept Check-In and Remediation

54





Concept Planner

All lessons are designed to be 60 minutes. The materials tisted in this chart are items to gather for each group. Items for the class or for individual students are indicated as needed.

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives	
10 Exploring Remain ders	No additiona, materiais needed	Divisor Outplient Remainder	Students will dentify the dividend, divisor, and quartent of a division problem. Students wit solve of vision problems. Students will explain what a remainder represents in a division problem.	
11 Patterns and Prace Value in Division	Number Cards (6-25) Six-sided Number Cube Graph paper (8 scn ne Master)	Divisor Divisor Chatlant Remainder	• Statents will use pace value, multiplication facts, and patterns with zerosite divide multiples of 10, 100, and 1,000 by one- digit divisors	
12 The Area Moderand Division	Lesson 12 Jarget Number Cards (Photocopy and clift apart the Backline Master at the end of the esson, one set of cards per small group)	Area mode. Divisendi Divisor Cuotent Rema nder	Students who use area modes to represent and solve division problems The problems of the pro	





Common Misconceptions and Errors

- Students may be conflued by having a reminder in a division problem. They may try to place the remainder into an existing group or into an additional group, both leading to unequal sharing.
- Students who are confused with what to do with the reminder may try to add the remainder to the quotient or subtract the remainder from the dipotent
- Stagents may only look at the place with the highest value and try to div.de. For example, with 2400 ÷ 3, they may try to solve 2 ÷ 3 histead of 24 ÷ 3.
- Students may be confused by now many zeros to put in a quotient, espec, a y when the related fact includes a zero.
 For example, the related fact for 2,000 ÷ 4 is 20 ÷ 4 = 5.
 The quotient is 500 since there are two other æres in the dividend.
- Students may get confused with how many zeros to place at the end of a product. For example, students may write 7 × 3,000 = 2,100 instead of 7 × 3,000 = 21,000. Students may also write 4 × 500 = 200 instead of 4 × 500 = 2,000
- Students may have difficulty determining which multiplies to use to start decomposing a dividend when using an area model. It is most effective and efficient to start with multiplying the divisor by 10, 100, or 1,000. For example, for 256 = 8, it is helpful to begin with 8 × 10 = 90 and to work up to 256.



Opportunities for Formative Assessment

Getting to Zamalek, Going to a Swim Meet, Fractice, Check Your Understanding

Division Patterns, Riding the Metro. Practice, Check Your Understanding

Target Number, understanding the Area Mode, Writing About Math. Practice, Check Your Understanding

Concept 2 Divining by 1 Digit Divisors

100	The state of the s	V		=
				11
			100	SET, CY
			A-14	The same
1				-

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
13 The Part s Conchents A gratinm	Moadanional museras needed	Parta quot ents ager thm	Students will use the partial quotients algorithm to divide dividends with up to four digits by one- digit divisors
14 The Standard Algorithm	■ No wall trainer the act the	Standard a gor thire Regroup	Students will estimate quotients using properties of place value and patterns in multiplication and division Students will use the stendard algorithm to so we all seen
15 D vis on and I Mult p leatler	No additional materials needed	Accuracy Reasonable Regroup	 Students will use properties of place value to accurate y record questients. Students will use the relationship between multiplication and division to their the accuracy of quotients.





Common Misconceptions and Errors

- Students may have difficulty determining which multiples to use to start decomposing a dividend when using area modes or the partial quotients algorithm. For those students, it may be ne pfull for them to start by multiplying the divisor by 10, 100, or 1,000. For example, for 7,236 = 6, it is helpful to begin with 6 x 1,000 = 6,000 and then multiply by 10 or 100 ont. The dividend has been divided evenly.
- Students may attempt to start dwelling in the Ones place.
 However, it is important to start dividing in the place with the highest value when using the standard algorithm for division.

- Students may attempt to start dividing in the Ones piace.
 However, they must start dividing in the piace with the highest value when using the standard a portion for division.
- Students may a ways put the first digit of the quotient above the first digit in the dividend without considering the place or the value of the digit.

(F)

Opportunities for Formative Assessment

Mode, Match, Partial Quotients Algorithm, Writing About Math, Practice, Check Your Understanding

Let's Try 1, Whiting About Math, Practice, Check Your Understanding

Place Value and the Culotient, Checking You'r Answer, From Gairo to Alexandria, Fractice, Check Your Ungerstanding

Concept 2 Divising by 1 Digit Divisors

-84

15		
		17-176
0	0.34	NO ADD
diele le		A

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives	
16 Solving Challenging Story Problems	• essent to Show and Solve Story Problems (Photocopy and but spart the story problems in the Blackline Master at the end of the essent Place the story problems around the room.)	Review vocabulary as meaned.	Students will organize information mistory problems to determine when to add, subtract, multiply, or divide	
			 Students wir solve story problems using addition, subtraction, multiplication, and division 	
Sonsept. Check-in and Temediation	• Waterials may vary	Review vocab_ any as negged.	Students will work to correct misconceptions and errors related to d viding by one-digit d visors	

Opportunities for Assessment:

iniadd tida to the assessment opportunities included in this chart, each concept will helicle a Concept Check-in





Common Misconceptions and Errors

- Students may solve part of a problem and think they are finished. It is important for students to thoroughly understand what is happening in a problem before solving it. This is part of any effective problem-solving process.
- 5t. dents who rely on key words may musliter, plet what is happening in the problem "Jsing Keywords in context is helpful in problem solving



Opportunities for Formative Assessment

What is the Problem?. Show and Solve, Writing About Math, Practice, Check Your Jhderstanding

Concept 2 Dividing by 1-Digit Divisors

LESSON 10 Exploring Remainders

Lesson Overview

in this lesson, students apply what they have learned about multip leaton, fact families, and place value to the diar arrander of divisor. Students explore what happens when a number cannot be divided evenly into another number. They discuss the meaning and implication of remainders.

Lesson Essential Question

 How call the relationship between thurtip ication and division be used to solve problems?

Learning Objectives

In this lesson

- Students will identify the dividend, divisor, and quateent of a alvision problem
- Students will salve a vision problems
- Students will an what a remainder represents in a division problem

Grade-Level Standards

4.A.2.d Find whole-humber quot ents and remainders with up to found git dividents and one-digit dividents and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.



Vocabulary Check-In

dymend, divisor, qualent, remainder



Materials List

No additional materials needed



Preparation

thip additions, preparation needed

DIGITAL



Leason 70

Exploring Remainders

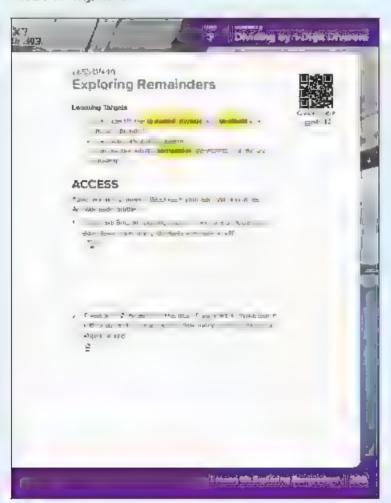


Ou ck Code egmt4042

552



Student Page 299



ACCESS (10 min)



THE UNITED OF HER TRANSPORT

- Studients may be confused by hexing a reminder in a division protection. They may try to place the remainder into an existing group or into assistant and a reminder.
- Students who are confused with what to do with the remainder may try to add the remainder to the quotient or subtract the remainder from the quotient.

Compare and Connect

- Direct students to Lesson 10 ACCESS Compare and Connect. Ask them to read the three problems with a partner.
- 2 Ask students to discuss now the problems are allie and now they are different. Students should in gallight or one is similar times and underline differences.
- Ask a few students to share their thinking with the class, claten for students who mention multiplication and division and how they are related to each other

Answer Key for Compare and Connect:

e) to the some hearsear at an oring not produced to the same and the interpretation as in the analysis of the

Lasson 10 • Exploring Remainders

BUILD (40 min)



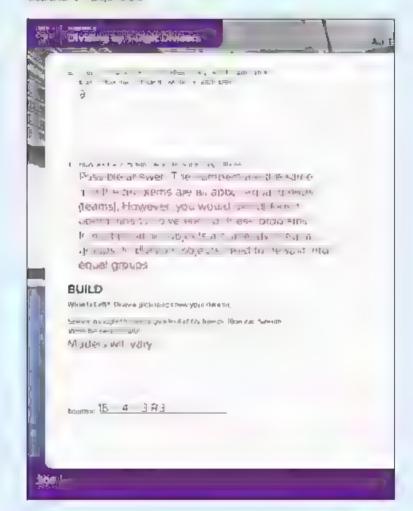
What Is Left? It's

- 1. Tell students that they are turning from multiplication to division. However, since multiplication and division are related, they will use multiplication to build understanding of division.
- 2 Direct students to Lesson 10 BL). D What is Left?
 Ask students to solve the problem on their own. Ask
 them to draw a pittle or write an equation to show
 their thinking. They will alsoover that they have a
 eft-over amount (remainder).
- Ask students to share their answers with their Shot, rier Partner Invite a volunteer to draw their sout, on on the beard."
- 4. Write 15 + 4 = 3 R3 on the board and ask students for record it in their Student Edition
- 5 Ask students what the numbers in the equation represent mittle problem, able the numbers in the equation equations with the correct vocabulary word.
 - This the dividence The dividence is the number out of total objects being divided in the problem
 - A is the divisor. The divisor is the number of squal groups or the number in each group
 - 3 is the quotient. The quotient is the answer to a division protein.
 - The second 3 is the remainder. The remainder is the quantity left over once all objects have been shared equally. One way to record a remainder is to write R and the number.
- 6. Ask students to discuss how they could have used the multiples of 4 to solve this problem. Ask, 4 times what number gets you close to 15 without going over? Explain that knowing about multiples and using thurtiplication facts will help students so we division problems.

Answer Key for What Is Left?

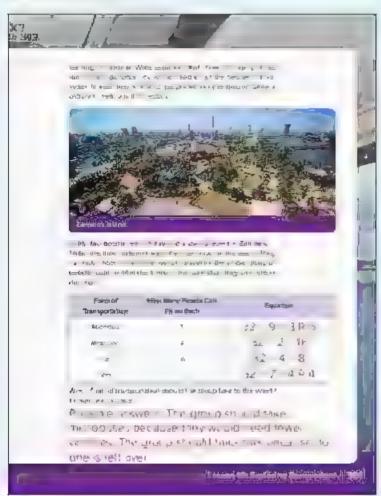
15-4-3 R3

PRINT





Studert, Page 301



Getting to Zamalek (25 min)

- 1 Direct students to the transportation chart in Lesson 10 Build Getting to Jamaier. Read the directions and the problem with students
- Assign students to small groups. Asi students to work with their group to determine how many people can trave, using each form of transportation Students should write equations, but may also draw pictures to support their thinking (Students wild accover that some efficients efficients pertation will eave a remainder of people behind.)
- 3. Once students write a division equation for each form of garisportation, students should make a recommendation, pased on their work, about which form of transportation the group should take to the revent.
- #. Engage students in a whole-group discussion about the remainder. Ask students to work with their groups to decide whether people donor go to Campler or they increase the number of vehicles needed.
- Ask students to share their recommendations with the class. Encourage students to use the vacabulary they have learned related to division.

Answer Key for Getting to Zamalek:

Microbus 32 + 9 § 3 R5

♦1 t.m. = 1 + 7 - 1c

a 32° 4 S

.ar 5 - 1 4 F4

Pearle need The gloup \$ 1. taken (1. secondary would need fewer and a Training should be a received to report of

CONNECT (5 min)



Going to a Swim Meet

Direct students to Lesson 10 CONNECT Going to a Swim Meet. Ask students to read and solve the broplem

Lasson 10 . Exploring Remainders





EAL MERNIOTE The problem in an increase statements to the remaining ensity the problem The should that about her increases that every means the every means that every means the every means that every means that every means the every means the every means the every means that every means the every mea

Answer Key for Going to a Swim Meet

Two less will be needed, but there we be empty sents of the services.

WRAP-UP (5 min)

(P) Let's Chat About Our Learning

- I Ask afew students to share their strategies for sowing this problem. Make sure to ask students to share their reasoning. If students suggest 1.1 buses, be sure to discuss the real avorto implications of that answer
- 2 Write 60 = 40 = 1 R20 on the board. Ask students to identify the dividend, divisor, quotient, and remainder with a different partner.

PRACTICE

Direct students to lesson 10 PRACTICE and have them complete the problems. Address student errors and misconceptions.

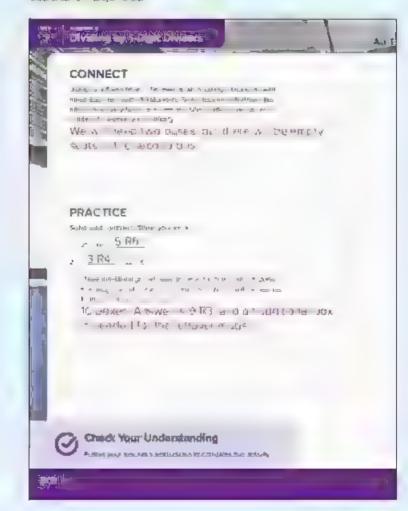
Check Your Understanding

- 1 50 ÷ 6 = 8 R2 90 ÷ 10 · 7 2 P 1 = 10 - 2
- 2 M is walked 12 k lometers, mer's ster walked 3 times as many kilometers as M is. How many kilometers did her's ster walk³

I would so ve this problem using multiple if in

- 3. Atmed heb #0 dates, He wants to give them to 6 of his friends. How many dates will each of his friends get if he shares them equally? WI, he have any left over?
 - 4. to Pil a officer, a good dates and white and together to

PRINT







Materials List

- Lesson 11 Number Cards (8-25) (1 set per pair of students)
- Six-Sided Number Cube (1 per pair of students)
- Scissors || par pair of students|
- Crayons
- "Graph paper () per stüderliğ



Preparation

Photocopy the Blacking Master at the end of the volume.

DIGITAL



Lesson 11

Patterns and Place Value in Division



Garick Code egimt4043

LESSON 11 Patterns and Place Value in Division

Lesson Overview

In this lesson, students expand on their understanding of division and how it is related to multiplication. They will be their intowiedge of place value and look for patterns as they divide in a tiples of 10, 100, and 1,000 by one-digit divisors.

Lesson Essential Questions

- How can the relationship between multiplication and division be used to sowe propiems?
- How can we use our knowledge of place value to multiply and divide those efficiently?

Learning Objective

In this lesson

 Students will use place value, multiplication facts, and patterns with zeros to divide multiples of 10, 100, and 1,000 by one-digit divisors

Grade-Level Standard

4.A.2.d find whole-number quotients and remainders with up to four-digit dividents and one-digit divisors. Using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.



Vocabulary Check-In

dividend, divisor, quotient, remainder

Lesson 11 . Patterns and Place Value in Division



ACCESS (10 min)



DOMMON MITCHNER ON AND

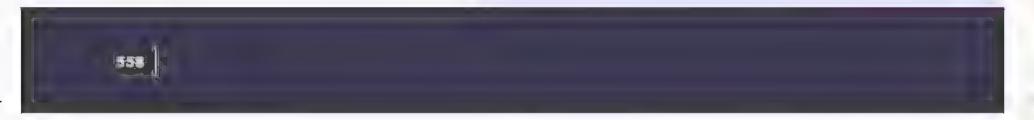
- Students may only look at the place with the flightest value and try to divide for example, with 2,400 ÷ 3, they may try to solve 2 ÷ 3 instead of 24 ÷ 3.
- Students may be confused by how many zeros to
 put in a quotient, especially when the related fact
 michales a zero. For example, the related fact for
 2,000 a 4 is 20 a 4 and. The quotient is 500 a noe
 there are two other latios in the givident.

Division Array Game

- 1. Direct students to Lesson 11 Division Array Game Distribute a set of Number Cards 6-25 to students and give them time to cut the cards apart. As students are cutting, assign them to partners (or have them work with their Shoulder Partners)
- 2 Explain to students that they are playing a game to help them learn about division, in the game, they create arrays to show division problems. Some of the phopiens may have remainders—what is left over after objects have been divided evenly.

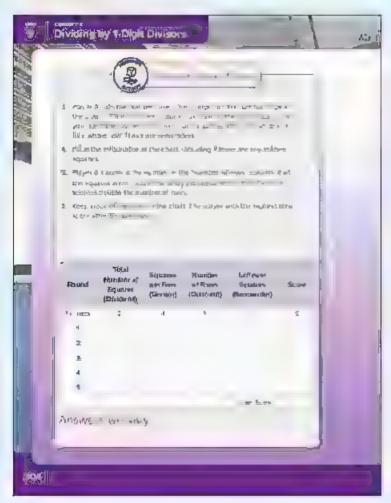
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Student Page 304



- Mode, how to play the game for students (See Example for Player for additional, information or how to shade quotients on the graph paper)
 - Puttifie two Number said decks together and shuffle them. Place the deck face down on the table.
 - Player A draws a number card. This number becomes the dividend.
 - Player A then rows the number cupe. The number on the number cube is the divisor.
 - Fit in the rolled intermed squares per row on the graph paper with you reach the dividend You may have squares left over that do not fill a whole row. These are the remainders
 - . A in the information in the table
 - Player A's score is the number in the "Number of Rows" column if all the squares were used in the amay (no remainders), then Player A's score is DOUBLE the number of rows
 - Keep track of the score in the table. The player with the highest total acore after 5 rounds whis

Example for Blayer A. Draws a 21 Rolls a 6 Player shades in 6 squares in each row unit they reach 21. 3 completed rows = 3 points

1	4.0	3	4	5	Φ_		
ブ	ß	9	10	11	12		
13	14	15	10	17	13		
12	P.	21					



BUILD (40 min)



Division Patterns

- Pirect students to Lesson 1.1 BU . D' Li vision Patterns and ask them to draw lines from each part of the aquation to the term that describes it.

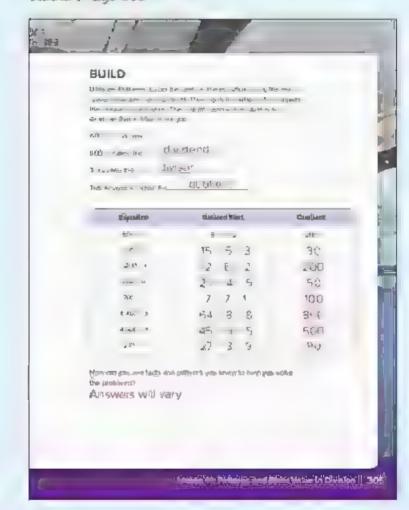
 600 s the dividend 3 s to 1 vision 1 200 is the quotient.
- 2 Explain to students that since 600 is such a large number and it is a multiple of 100, that they can use a related fact of 6 = 3 and the patterns they have learned related to 10s, 100s, and 1,000s to solve the problem
- 2. Write 6 ≠ 3 = 2 cm (he bossed and se size this back to the multiplication facts 3 × 2 ± 6 and 2 × 3 = 6. Ask students how they could apply their knowledge of patterns with zeros to so ve the problem.

 It lies to 11... of +1... the trat 2 × 3 s 6... × 3 cc... × 3
- 4 Explain to students that they should use the table to think effected facts they can use to solve the problem Students may work independently or with a partner to complete the table. If students are similarly, work with the whole class to complete some of the problems.
- 5. Once students have completed the table, ask them to respond to the reflection question. After a few missies, ask students to share their dues. Make sure students recognize that the number of zeros in the dwident sine same as the number of zeros in the quotient unless the related fact has a zero, in it

Answer Key for Division Patterns:

Equation	Related Fact	Quotient
600 3	6-3-2	200
150 5	15 1 7	a (
1,200 = 6	1 2	
200 + 4	, - 7 4	r
700 + 7	7 1	1
6,400 ÷ 8	- · · · E · · · · · ·	8
4 500 ± 9	41 7 5	56
270 + 3	** * :	**

PRINT





Studert Page 306



CONNECT (7 min)



Riding the Metro

Direct students to Lesson 1,1 CONNECT Riding the Metro and ask them to solve the problem.

TEACHEM NOTE The sourcety is a great opportunit to the size of the source the size of the

WRAP-UP (3 min)



Ask students to share the strategies they used to solve the problem in CONNECT Listen for strategies that include place value and patterns with zeros

PRACTICE

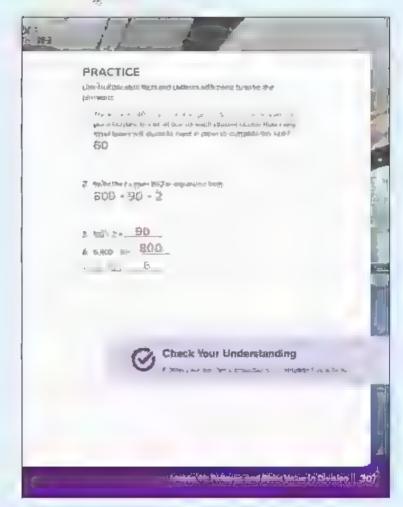
Direct students to besson 11 PRACTICE and have them complete the problems. Address student errors and imisconceptions

Check Your Understanding

Use multiplication facts and patterns with zeros to solve the interpress.

- I Malik wanted to makefalafel. He bought 360 grams of fava beans at the store, He read he would need about 6 grams of fava beans per fainfel patty. How many falafel patties can be mare using all of his beans?
 - 360 + 6 + 60 falafel pathes
- 2. 4.560 = 5 900
- 3 630 1 90
- 4 400 = 3,200 = 8
- 5. 430 # 9 = 70

PRINT







Materials List

 Light 7 Lesson 12 Target Number Cards (1 set of cards mer group)



Preparation

Photocopy and cut apartitite Biscilline Master at the end of the volume.

DIGITAL



The Area Model and Division



Guick Code egitt4044

LESSON 12 The Area Model and Division

Lesson Overview

In this asson, students earn how to use the area model to solve division problems. Students gamed familiarity with the area mode strategy when learning about multiplication. Applying the strategy to solve division problems helps to tenforce the relationship between multiplication and division. Students should continue to look for patterns and place value to ationships to solve prometris.

Lesson Essential Questions

- How can the relationship between multiplication and division be used to solve problems?
- How can we use different strategies to help us understand muttalig timultiplication and division?

Learning Objective

in this lesson

 Students will use area modes to represent and so ve division problems

Grade-Level Standards

4.A.2.d Find whole number quarters and remainders with up to four right dividends and one-dight divisors. using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.

4.A.2. Listrate and explain calculations using aquations or mode s



Vocabulary Check-In

area model, dividend, divisor, duotient, remainder

Lesson 12 - The Area Model and Division

56



ACCESS (10 min)



DOMESTICAL MICHAEL THE STATE STATE

- Students may get confused with horamany zeros
 to place at the end of a product. For example,
 students may write 7 × 3,000 = 2,100 instead of
 7 × 3,000 = 21,000. Shadents may also write
 4 × 500 = 200 instead of 4 × 500 = 2,000
- Students may have difficulty determining which multiples to use to start decomposing a dividend when using an area mode, in its most effective and efficient to start with multiplying the divisor by 1:0, 1:00, or 1,000. For example, for 256 = 8, it a fix plus to begin with 8 × 1.0 = 50 and to work up to 256.

Target Number

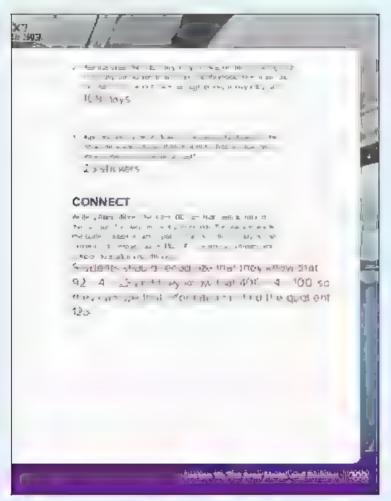
- Divide students into small groups of four or five and distribute a set of Target Number Gards to each group.
- 2. Explain to students that the cards contain numbers that will be combined in a fferent ways to create a "target number." When the target number is given, then group should work together to find cards that combine to create the target number. For example, if the target number is 100, students could use cards 50, 40, and 10. If students finish early, they can use the remaining cards to find a different combination of numbers.
- 3 Write 50 on the board. This is the first larget number Observe stacents as they work together to find cards that add up to 50.
 - The second of th
- 4. Ask a few groups to share their combinations and record them on the postd. For example, you may have one group that made 50 by putting together 20 + 20 + 5 + 5 and another that used 30 + 10 + 10
- 5 Repeat with two to three different target numbers that are injustiples of 5 or 10

PRINT





Student Page 309



BUILD (40 min)



Understanding the Area Model

- Direct students to Lesson 12 BUILD Understanding of the Area Mode and ask them to read Problem 1 siently
- Ask students to furn and fall about whether each classroom could get 10 pooks. Listen for students who say classrooms will takely more than 10 pooks pecause 6 x 10 is only 60.
- 3. Ask students to Turn and Talk about whether each classroom could get 15 books, ustern for students who say that each classroom cannot get 15 books because 6 x 15 is 90, which is more than 89
- 4. Write 89 ± 6 ± on the board. Ask students to reantify the dividend and the divisor in the problem. In this problem, the divisor represents how many classes will receive books (or the number of eggs groups that must be created).
- 5 Tell students that today they will pain how to use an area mode for givision. To begin, they will necompose the dividence into multiples of the divisor.
- Draw a rong rectangle on the board and write 6 on the eft side of the box

- 1		
6.1		'
-		

Ask students now many books would be used if each classroom got 10 books. Since 6 x 10 is 60, remind students that 60 is a multiple of 6 which is the divisor in this problem. Draw a vertical line made the rectangle. Write 6 x 10 = 60 ms de the section of the mode, and 10 underneath.



8. Explain to students that they have just divided up 60 of the 89 books. Ask students how many books are eff to divide and if they can make more groups of 6. Ask students to tail to their Shoulder Partner (89 - 60 = 29)

Lesson 12 - The Area Model and Division

565

7 Dividing by 1-Digit Divisors



- 9 Do a Think Aloud to model your thought process for students
 - . There are 29 beaxs left to divide
 - know that 6 × 5 = 30, which is too much 6 × 4 ÷ 24
- 10. Write 6 × 4 = 24 inside the empty section of the mode, and 4 underreath. Since there are not enough to make another group of 6, there is a remainder. Write 5 duts de the rectangle.



- 14. Continue to do a Think A sud
 - I show that 60 ± 24 | 84, so that means "have 5 books aft over , can record the remainder next to the area mode.



- 12 Exprain to students that they have decomposed 89 into 60 # 24 # 5. Circle these members in the area mode and as a students to confirm that the sum of those numbers is 89
- 13 Ask students if they know how many books each classroom will get. Allow time for discussion. Explain (or confirm) that in order to find the quotient, we must add the numbers that were multiplied by 6 10 and 4. So, each class will get 14 books.
- 14 Reread the question. Ask students what the answer to this problem means and what the remainder means

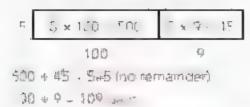
the south of the second of the second that there are 5 pooks aftiover that the second eventy among the second.

- 15. Allow students to copy the area model and solution for Problem 1 into their Student.
- 16 Read the next problem as a group Ask students to work with a partner or small group to solve the problem using the area mode. After most students are finished, go over the answer together Ask students to help you create an area mode on the board Remind students that there are different ways to decompose \$45 Howevet, every group should be using the same divisor—5. Different groups may try different approaches

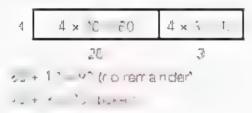
The live of the important to not in the season multiple of acceptable ways the distribution of a transmission of the medical live of multiple of the distribution of t



17 Ask a few groups to share how they created their area model on the bloard. (One possible decomposition of \$45 is shown.)



- 18 Ask students to Turn and Talk with their Shoulder Partner about what they notice about the different solution strategies of time allows, ask students to share their thinking with the class
- 19 Ask students to try the remaining problem on their own. Go over the final answer together



CONNECT (7 min)



Writing About Math

Direct students to lesson 12 CONNECT Writing About Math and ask them to respond to the prompt

EACHER NO E Consider Langth steast es a formative asset smooth to determine when it is students the at lie to dentify partie and reliationships and use there to solve problems.

Answer Key for Writing About Math:

Students show direcognize that they work what v2 + 4 23 and they know that \$00 + \$= 1. Set exists \$= that information to find the quotient 123.

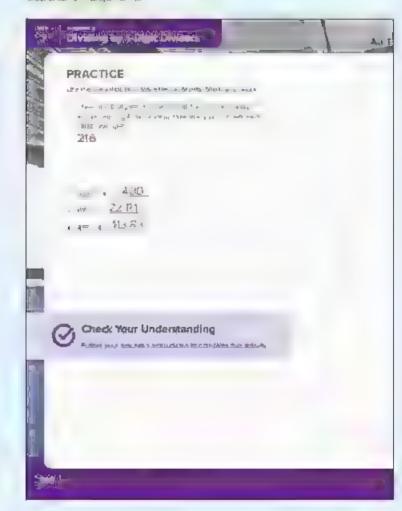
WRAP-UP (3 min)

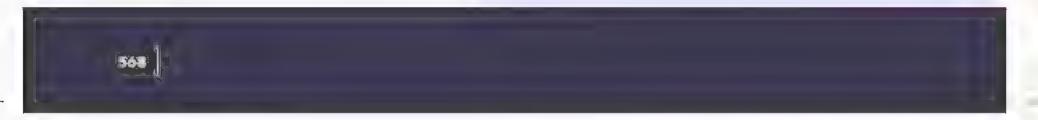


Let's Chat About Our Learning

Asi students to share what they notice and wonder about the area model. Encourage students to ask questions, especially if you have noticed that some students are struggling to decide flow to decompose the dividend

PRINT







PRACTICE

Direct students to Lesson 12 PRACTICE and have them complete the problems. Address student errors and misconceptions

Check Your Understanding

Solvé division problems using an area mode

Possible a sampode, a sample to the derivative of a sample set as a sending the end against the sending sample set as a sending set of the sample set of the

1. Nashwa saved 858 colos last year. She wanted to put their late 8 jars. How many colos will go in each jar $^{\circ}$

108 with 4 eft over 108 R4

2. 810 = 9 = 90

2 × 90 = 810 (no tem atrider)

3. 93 - 4= 23 円

4 250 3 = 53 R1

LESSON 13 The Partial Quotients Algorithm

Lesson Overview

In this essen, students use the partial quotients algorithm to divide by one digit. As in previous essons students are asked to make connections between propriation was easied to make connections between propriation to support their eathing. Students use multiplication facts, place value, and patterns in zeros in the pattern to solve and explain division problems.

Lesson Essential Questions

- How can the relationship between multiplication and a vision be used to so ve proplems?
- How can we use different strategies to help us understand multidigit multiplication and division?

Learning Objective

In this lesson

 Students win use the partial questions algorithm to divide dividends with up to four digits by one-digit divisors

Grade-Level Standards

4.A.2.d Find whole number quotients and remainders with up to four-digit dividends and one-digit divisors using strategies based on place value, the properties of operations, and/or the relationship between multiplication and place on

4.A.2. . Lustrate and explain calculations using equations or models.



partial quotients algorithm



Materials List

No additions mater as needed



Preparation

No additions, preparation needed

DIGITAL



Lesson 13

The Partial Quotients
Algorithm

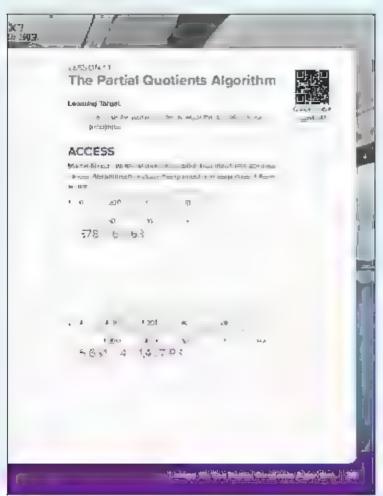


CL cr Cade earnt4045

570



Student Page 311



ACCESS (5 min)



THE UNITED AND AREA TO ARREST

Students may have difficulty date minimized which which per to use to start decomposing a dividend when using area modes or the partial quotients a gorithm. For those students it may be helpful for them to start by multiplying the divider by 10, 100 or 1,000. For example, for 7,236 ± 6, it is helpful to begin with a × 1,000 ± 6,000 and then mustiply by 10 or 100 until the dividend has been divided evenly.

Model Match

- 1. Direct students to Lesson 13 ACCESS Made, Match Read the directions with students and give students time to write equal ons that match the area models Remind students to include the quotient and the remainder
- 2. Remind students that there is more than one way to decompose a dividend when using an area mode for olivis on if time allows, ask students for another way to decompose 5.631.

 Possible answers include 1.100 + 2.000 + 1.600 + 2 in + 5 +

Lesson 13 - The Partial Quotients Algorithm

BUILD (45 min)



Partial Quotients Algorithm

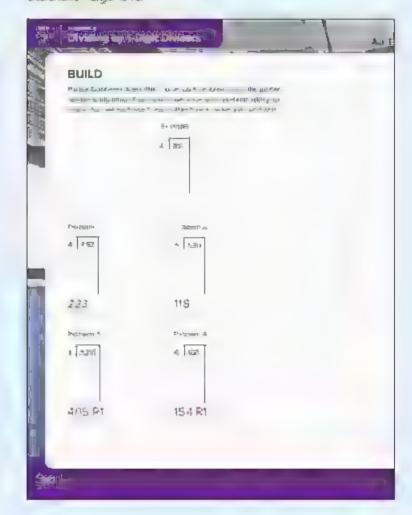
- i. Write 4 x 5 = 5 + 5 + 5 + 5 on the board. As a students to discuss what this equation means, if necessary, explain that it shows that multiplication is repeated addition. As the following question and a low students to discuss
 - If multiplication is the same as repeated addition and division is the opposite of multiplication, what does that tell us about division?
- 2 If necessary, explain that another way to think about division is as repeated subtraction.
- S. Write 42 = 6 am the board. Ask students now they could use subtraction to solveth's problem if students need help getting started, write 42 = 35. Keep subtracting 6 until there is nothing left to subtract. Show students that they could subtract / groups of 6

- 4. Explain to students that subtraction will be meentarit in the division strategy they work on today Write "partial quotients" on the board
- Ask students to tunning their Shoulder Partner to there so what comes to think when they think about the words "partial quotients," Ash students to share their lideas with the class.

 I sen for tundents who mention that partial's eather that you have that the quotient of the answer to a division problem and that supports earned the partial products and in in low much cast of
- 6 Direct students to Lesson 13 Bu . D Partia.

 Outstlants Algorithm. Write the problem 4 1897 on the board. Explain to students that this is another way of writing a division problem. The dividend goes underbeath the ine and the divisor goes to the eff of the symbo.

PRINT





7. Draw a line-down the far right side of their equation

4 07

6 Look at the dividend. Ask students what the 8 in the dividend represents, (800) Ask students finate is a multiple of 4 that heips them so ve 800 divided by 4

is an internation of a section of the property for the property of the proper

- Show students how to write the part of the quattern (200) on the right side of the line 1/897 200
- 10 Ask students to confirm that 4 × 200 is 800. Write 800 Under the dividend and subtract from 897.

48 0 -800

11 Ask students to look at the 97 that is left. Ask students to turn to their Shoulder Partner and discuss a multiple of 4 that is close to 97. (Students may say 80, 98, or 98 a left which are accurate.) Remindistudents that there are multiple ways to decompose numbers. Write 10 as part of the quotient on the right side of the line.

4.7 2.3 8.7 2 10

12 Ask students to confirm $4 \times 10 - 40$. Write 40 under 97 and subtract. Ask students what is left to divide (57) H ave them talk to their Shoulder Partner about what they could do ner.

7 Dividing by 1-Digit Divisors



- 13 Repeat writing 10 as part of the quotient on the right side of the line and writing 40 under 57 Subtract. Ask students to share their thoughts with the group
 - 4 897 200 - 800 - 97 10 - 40 - 57 10

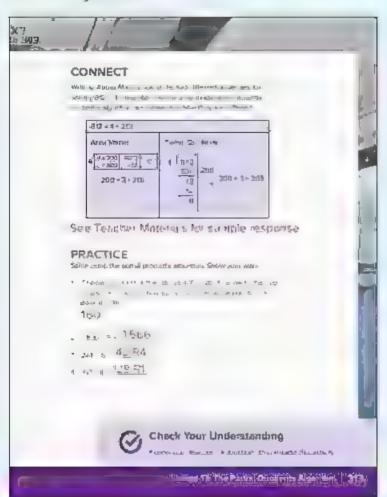
- 40

- 17

 14. Ask students what multiple of 4 gets them closest to 17 (16) Show students how to write 4 as part of the quotient on the night side of the line and subtract 16 from 17
 - 4 897 200 80L 97 10 40 57 10 - 40 17 4 - 16
- 15. Ask students if A divides equally into 897.
 They should notice that it does not becomes the animal order of
- 16. Is, i students that they can how find the quaterit. Explain that the parts of the quotient are along the night side. They must add all of the partie, quotients to get the complete quotient. Reported students to include the remainder as part of the final quotient. 200 + 10 + 10 + 10 + 4 = 224 F1
- 17. Threat students to Lasson 14 Partial Quotients Algorithm and ask them to copy the partial quotients algorithm for $897 \approx 4$ from the board
- 18. Divide students into groups of 4. Explain to students that each member of the group will choose one of the four BULD problems and try to solve it using the part all quotients algorithm. They will then share their work with their group, helping each other learn how to divide using the parts, quotients algorithm.
- 17 Give students about 5 minutes to work if students are strugging, work together to solve another example on the board
- 20 At your signal, students should share their work with the other members of their group. Encourage students to ask questions of each other and to help each other practice this strategy.



Student Page 313



CONNECT (7 min)



Writing About Math

Direct students to Lesson 13 CQNNECT Writing Accut Math. Ask students to work independently to respond to the prompt.

Answer Key for Writing About Math:

Students may response that both strateges on we in the test of the management of the end
WRAP-UP (3 min)



Ask students to share their responses to the Writing About Math prompt. Encourage students to ask each other questions

Lesson 13 - The Partial Quotients Algorithm

PRACTICE

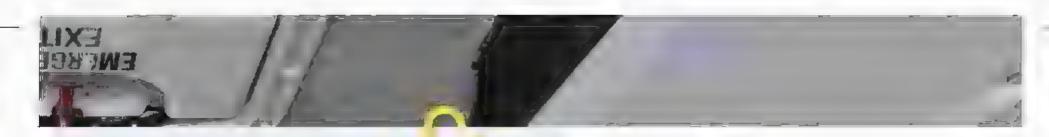
Direct students to Lesson 13 PRACTICE and have them complete the problems. Address student errors and misconceptions

Check Your Understanding

Solve using the partial quotients a gorithm

An industrial machine made 1,026 cans of diet social and 5 times as many regular social over the course of 45 minutes. The regular social were then placed into 2 shipping box containing the same number of social show that yield at social were in each shipping box?

2 737 ÷ 4 13. F 1 5,724 ÷ 8 ÷ 715 F 4 792 ÷ 3 = 264





Materials List

No additional materials needed



Preparation

No additional preparation needed

DIGITAL



The Standard **Division Algorithm**



eq17114046

LESSON 14 The Standard Division Algorithm

Lesson Overview

in this lesson, students are introduced to the standard a ganthm for division and make connections to the area mode and the partial quotients algorithm. Students use multiplication facts, place youre, and patterns in zeros mimultiplication to solve and explain division problems They should recognize that, while a left the strategies they have learned are effective, the standard algorithm is the most efficient care it is mastered

Lesson Essential Questions

- How can the relationship between multiplication. and division be used to some problems?
- How can we use our know edge of place value to multiply and divide more off a entity?
- How can we use different strategies to help us suderstand multidight multiplication and division?

Learning Objectives

In this lesson.

- Students will estimate quotients as no properties of place we've are and patterns in multiplication and
- Students will use the standard a gorithm to so ve divis on problems

Grade-Level Standards

4.A.2.d filind whole-mumber all of ents and remainders with up to foundight dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division

4.C.1. Assess the reasonabieness of answers using mental computation and estimation strategies including (១៧_ខង្គការនៅ



Vocabulary Check-In

stantiand algorithm, regroup

Lesson 14 - The Standard Division Algorithm



ACCESS (10 min)



COMMITTE TO SELECT OF A CALL

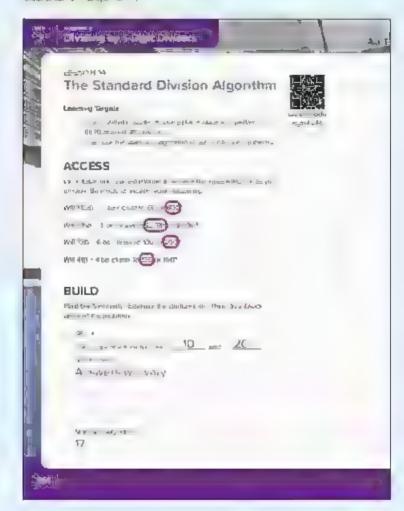
Students may attempt to start ofvioling in the
Cines place. However, it is important to start
of viding in the place with the highest value when
using the standard algorithm for all whom.

Let's Estimate

- 1 Direct students to Lesson 14 ACCESS Let's Estimate and go over the direct ons with students. Remind students that estimation is a good way to the pideo decide if an answer is reasonable. Give students time to answer the questions.
- 2 Ask students to talk to their Shoulder Partner about their estimates if there is time, discuss a few problems and ask students what makes the estimates reasonable.

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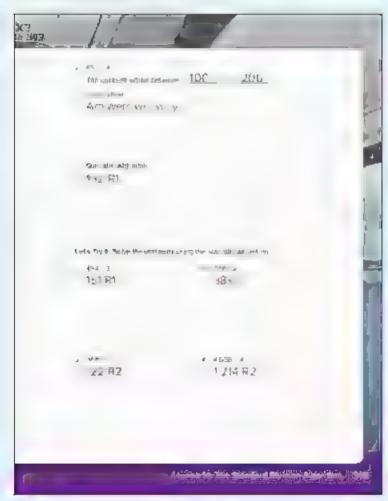
Student Page 314





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Student Page 315



BUILD (40 min)



Find the Similarity (20 muri)

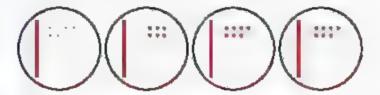
- 1 Direct students to Lesson, 14 BULLD Find the Summerity, Ask students to estimate the quotient of 68 + 4
 Lising estimation, the quotient should be between 16 and 0
- 2 Ask students to do a Ou at Draw of the problem
 Ask students how many fens they could put in each
 group so that each group detaithe same number of
 Tens 1



 Ask students to Tam and Talk about what they could do with the 2 reft over Tens (regroup each Ien Into 10 Ones) Now there would be 28 ones.



4. Ask students how many. Ones they bace in each group (7). Remind students that the quotient in this problem is now many are in each group (17).



- 5 Explain to students that today they will be learning how to use the standard algorithm for division
- 6. Write the following steps on the board. Set Lip. Divide, Multiply, Subtract, Leave the steps on the board during the lesson. Made how to solve 68 ± 4 using the standard algorithm.
 - Step 1 (Set up) Set up the problem. The
 dividend goes under the line and the divisor
 goes to the left of the division symbol. Remind
 students that this is another way to set up a
 division problem.

Lesson 14 - The Standard Division Algorithm



- - o Write 1 on top of the one above the 6. Exp ain that the remainder is not recorded at this time.
- Step 3 (M., tiply): Explain that the value of the 1 is 10 because it is in the Tens
 place Think 4 times 10 s 40. Write 40 underseath 68 Point out that 40 is the part
 of the dividend that was just divided.
- Step 4 (Subtract): 68 40 is 28 Record the difference
- Step 5 (D wide) Explain that 28 is the new dividend 28 + 4 = 7 Write / above the B in the Ones place
- Step 5 (M., tiply): 4 × 7 = 28 White 28 midemesth 28
- Step 7 (Subtract) 28 = 28 is 8. There is nothing-more to givide and there is no remainder.
- Read the quotient on top of the line, 68 divided by 4's 17.

- Anew students to copy the standard agorithm for 68 4 from the board. Ask students to think about what is a prior between their Outer Draw and using the standard a gorithm
- 8 Insite students to share their tranking with the class

 "In any responses that mention starting to divide at the place with pighest value

 to be arrow to their transmissions to deat to a local transmission at their are to
- Repeat the steps to model how to solve 457 ÷ 3. (152 R1)
- 18. As students where they see the remainder in this problem. Show students where to write the remainder post to the answer. As students to share what they not ced about this problem and any questions they have
- 11. Allow students to copy the standard algorithm for 457 3 from the board.



Let's Try It (20 面面)

- 1 Ask students to turn to Lesson 14 Bu . D Let's Try it
- 2 Write 454 = 3 on the board. As a students to solve this problem along with you mathem Student Edition.
 - Step 1 (Set up) Set up the problem identify where the dividend and divisor are in the problem.
 - Step 2 (D vide) Think 4 ÷ 3 1 with a remainder Write 1 above the me over the
 4 Remind students that this 1 actually represents 100 since it is notice Hundreds
 place.
 - Step 3 (Multiply). Think: 3 x 100 = 300. Write 300 underneath 454 from out that 300 of the part of the dividend that has just been divided
 - Step 4 (Subtract): 454 300 = 154
 - Step 5 (D vide) Look at 154 Point out that 150 is close to 154 and that a related lact is 15 ÷ 3 = 5. 150 ÷ 5 = 50. Write 5 above the line over the 5. Remind students that this 5 represents 50 since it is in the Tens place.
 - Step 6 (Multiply) Think: 3 x 50 = 150. Write 150 underneath 154.
 - Step 7 (Subtract) 154-150 4
 - Step 8 (Divide): Think: 4 ÷ 3 1 with a remainder. Write a 1 above the line over the 4. This 1 represents 1 since it is in the Ones place.
 - Step 9 (Mutt.ply)" Think 3 x 1 3 Write 3 under 4
 - Step 10 (Subtract) 4 3 1
 - Step J1 (Divide) Since 1 cannot be divided exemly by 3. 1 is the remainder

3 Ask students to work with a partner or small group to solve as many of the remaining problems as they can using the standard algorithm. If students are struggling, do another example on the board together.

Answer Key for Let's Try It.

- 1 454 5 ± 151 R1
- 7 77 7 | 384
- a 4 650 4 1 214 E2

CONNECT (7 min)



Making Connections

1. Ask students to jum to Lesson 14 CONNECT Maring Connections Ask students to solve the problem using at least two different strategies

Answer Key for Making Connections:

Accept all sthategies that yield a contect and were 8d + 7 = 112

TE -"- The start man of the affilt why defin tamowt est हर्दकार जानाना है। विशेषण कि प्राप्त और क्षेत्रकार कि कि े भारतान महिल्ला है कि स्थान है कि स्था है कि स्थान है

WRAP-UP (3 min)



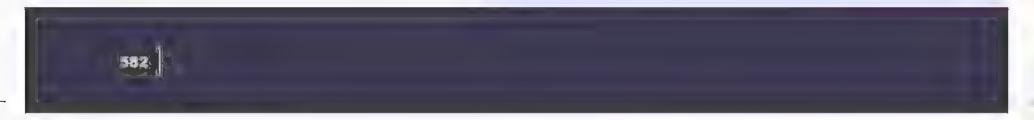
Let's Chat About Our Learning

Ask students to reflect on the different division strategies they have teamed for dividing by one-digit numbers. Ask students which strategy is easiest for them to use. Ask students which strategy they want to practice more in order to improve their division sk. is

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Student Page 316

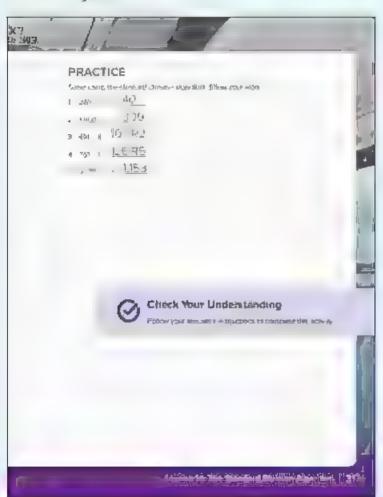






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PRACTICE

Direct students to Lesson 14 PRACTICE and have them complete the problems. Address studentierrors and miscenceptions

Check Your Understanding

Sowe weing the standard a gorithm

4.200 ₹ 6 = 700

832 4 4 - 708

2895 = 2 1 447 R1

LESSON 15 Division and Multiplication

Lesson Overview

In this essen, students continue to practice the standard a genthm for divelon and determine where to place the first olds in the quotient. Students also learn new to use much pleasion to check the accuracy of the noticents, with and without remainders. This essent is verificable continued opportunities to build fluency and to chart up misconceptions as they develop deep understanding of the process and meaning of division

Lesson Essential Questions

- How can the relationship between multiplication and division be used to solve problems?
- How can we use our know edge of place value to multiply and divide more efficient, y?
- How can we use different strategies to help as understand multiplift multiplication and division?

Learning Objectives

in this lesson

- Students will use properties of place value to accurately record quotents
- Students will use the relationship between multip reation and division to check the accuracy of quotients

Grade-Level Standards

4.A.2.d Find who e-pumper quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division

4.C.1. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.



Vocabulary Check-In

accuracy, reasonable, fegroup



Materials List

No additions materials are needed



Preparation

thip additions, preparation is meaded

DIGITAL



Lesson 15
Division and
Multiplication

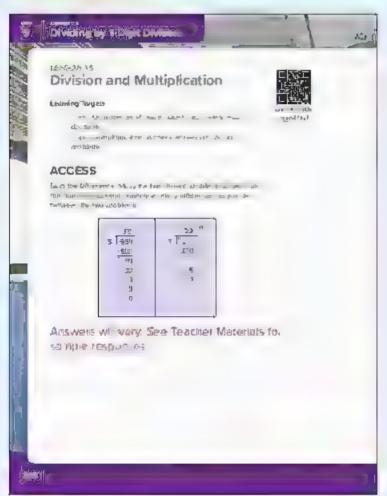


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ACCESS (5 min)



- Studients may attempt to start dividing in the Ones place impowerer, they must start dividing in the place with the highest value when using the standard algorithm for division.
- Studentsmay aways put the first of the quatient above the first olds in the dividend without considering the place of the value of the digit

Spot the Difference

- To Direct students to Lesson 15 ACCESS Spot the Difference and ask them study the two division problems solved using the standard alignrithm. As students to identify as many differences as they can between the two problems.
- 2 Ask students to share their observations with their Shoulder Partner Ask a few students to share their deas with the class

Answer Key for Spot the Difference:

Acceptal concept assponses and istentally aget, a structure of a serious and passes to the serious and the ser

Lesson 15 . Division and Multiplication

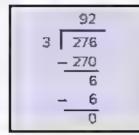
BUILD (45 min)



Place Value and the Quotient 130 must

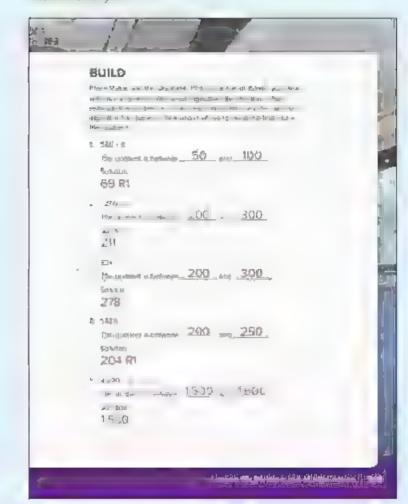
- he polarito students that sometimes the quotient to a division problem has the same number of aig to as the clividend, but sometimes it has fewer a gits Today students investigate why while practicing the standard algorithm
- 2. Write 276 = 3 on the board. Ask students to estimate the qualient.

 It = qualient will be peliween 90 and 100 3 × 90 = 270 and 3 × 100 = 300.
- Ask students to help solve the problem using the Set Up-Dw. at-Multiply-Subtract steps.
 - Step 1 (Set up), Set up the problem vertically.
 - Step 2 (Divide): Remind students to start
 gived no with the place that has the highest
 value. Think 2 = 3. The 2 represents 2.
 Hundreds, but can always 2 into 3 equal
 groups?
 - Point out to stagents that since there are not enough Hundrads to divide even y among the 3 groups, the 2 Hundreds must be regrouped. The 2 Hundreds become 20 Tens
 - o thowever, there are already / Tens in the dividend. Four out to students that when they rook at both the Hundreds digit and Tens digit rogether, they represent 27 Tens.
 - Think 27: 3=9. Because we are dividing nto 27 fens (and not 2 Hundreds), we must write the 9 above the fens place.
 - Step 3 (Multiply) Finnic 3 x 9 Tens, or 3 x 90, is 270, White 270 and emeath 276
 - Step 4 (Suptract): 276 270 ± 6
 - Step 5 (Divide): Think 6 ÷ 3 | 2. Write 2 above the 6 in the Ones place
 - Step 6 (Mult piy): Think 3 times 2 Ones is 6
 Write 6 beneath the 6
 - Step 7 (Subtract) Suptract 6 6 0. There is nothing eff to divide and there is no remainder



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- Direct students to Lesson 15 BuilD Place Value and the Quotient. Read the directions with students to ensure they understand the task. Students may work independently of with a partner based on the r needs
- 5 malve students step working at the end of this Earling segment. Tell, students they will now onecr their answers on train own.

Answer Key for Place Value and the Quotient:

- 340 = 5 = 60 PT
- 264-5-11
- 6 44 B B
- 42.2 7 2014 R1
- * 4 * +0 3 -1 5 3
- 7 For 3 11 R.

Checking Your Answer (15 m h)

- f. Ask students to discuss with the riShoulder Partner the different ways they have used multiplication. in sa ving division problems. After a few minutes, remind students that murtiplication and division are inverse operations. They can be used to "windo" each other and check answers
- 2. Write 627 = 5 ____ on the bloard, Ask students to help you solve the problem using the standard algorithm (126 RZ), if mecassary, ask questions to prompt students' thinking about each step of the process, where to record the quotient, and how to record the products and differences
- 3. Explain to students that estimation can help us decide whether an answer is reasonable, but multiplication can be used to check fran answer is correct. Mode, now to use multiplication to check the quotient of 627 = 5 by multip ying 125 x 8 = on the board. Ask students to help you so we the multiplication problem (625)
- 4. Since the product and the dividend are not the same, ask students if the quotient is incorrect. Ask a few students to share their deas, migh gift any responses that mention the remainder

CONCEPT 2 Dividing by 1-Digit Divisors

- 8. Explain to students that when checking division using multiplication, students must multiply the quotient by the divisor and then add the remander fithe quebent and the remainder are correct, the answer should be the same as the dividend.
- 6 Direct students to Lesson 15 BULD Checking Your Answer Ask students to salest three problems from Lesson 15 BUILD Place Value and the Quittient and check the answers to those problems using. multip teat on

CONNECT (7 min)



From Cairo to Alexandria Ask students to turn to l'esson 15 GONNECT From Cairo to Alexandria and read the prompt's entry. Make sure students understand that they are not being asked to find the guotient, but must describe the steps they would tell a friend to take to so ve it.

Answer Key for From Caire to Alexandria:

full diarres has independently site at one can the disconproperty of the present of the part of the salt. a frethmom of establishing of the derive is rea resentage then in exempted on the tail or - Willett sisteman ville and mach arrower, this Aut et leit utate is showers - Lamparend Leit er triend street then an into , the highest the strotter. ər. এ পাইটো

THIR MOTE Cotts let Jacket With J rg market managable is a subst agastif or seal permit metal of conto active many on all division strategates

WRAP-UP (3 min)

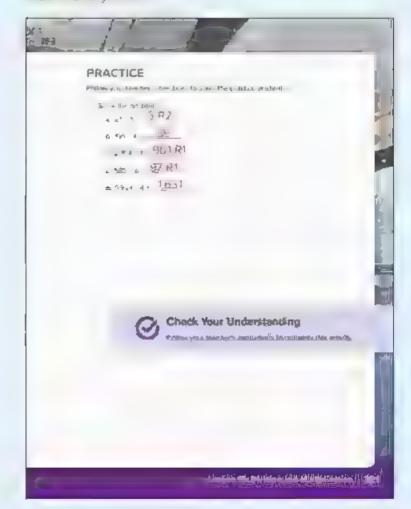


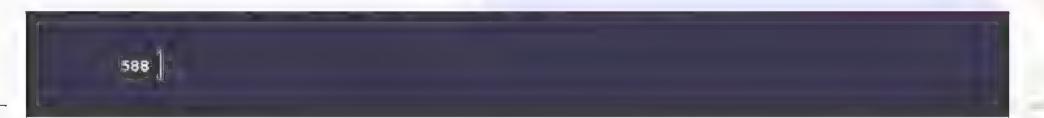
Let's Chat About Our Learning

Ask students to a scuss the chall thiges of teaching someone else haw to salve division problems versis solving the problem themselves. Encourage students to ask questions of each other and to seek clarity through guest.on na

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Student Page 321







PRACTICE

Direct students to Lesson 15 PRACTICE and have them complete the problems. Address student eners and misconceptions

Check Your Understanding

Solve using the standard algor thm. Use multiplication to check your answers

- 1. 48 = 7 = 6 FC
- 2 840 6 14(
- 3 3017-3- "OF R.
- 4 6,548 8 813 64
- 5 700 + 8 75

EEL.CY

LESSON 16 Solving Challenging Story Problems

Lesson Overview

In this essen, students practice a four operations—
or a combination of operations—to solve problems
Students should be applying concepts from place value,
multiplication, patterns in multiplication and division,
and division strategies to solve and check division,
problems. This approach helps students important
that ship and concepts numericates are indeed
interconnected and reveal patterns that can be used to
build understanding and solve problems

Lesson Essential Question

 How can we use math to help us understand and solve real-world proplems?

Learning Objectives

In this lesson

- Students will organize information in story problems to determine when to add, subtract, multiply, or divide
- Students will solve story problems using addition, subtraction, multiplication, and division

Grade-Level Standards

4.A.2 Use place value understanding and properties of operations to perform multi-digit arithmetic

4.C.1.d Solve multistep word problems posed with whose numbers as no the four operations, including problems in which remainders must be integrated.



Vocabulary Check-in

Review vocabulary as needed.



Materials List

 Light 7 Lesson II & Show and Solve Story Problems



Preparation

Photocopy and cut spart the story problems in the Biackline Master at the end of the volume

Prace the story problems around the room

DIGITAL



Solving Challenging
Story Problems



Ou cr. Code egmt4048



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ACCESS (10 min)



THE UNITED STATES

- Studients may so we part of a problem and think
 they are finished it is important for students to
 thoroughly understand what is happening in
 a problem before spiwing it. This is part of any
- Effective problem-solving process.
 Students what rely on key words may informer pret what is happening in the problem: Using keywords in context is happening problem solving.

What is the Problem?

- 1. Ask students to describe the process for using maltiplication to check the answers to division problems. Encourage and praise the accurate use of mathematica language. Provide the language as needed, writing terms on the board so all students can see them.
- 2 Ask students to turn to Lesson: 16 ACCESS What is the Propiem? to solve the problem. After a few minutes, go over the arrower together.

Answer Key for What is the Problem?:

181 - 7 = 73

Lesson 16 - Solving Challenging Story Problems



BUILD (40 min)



Three Reads (15 av. 1)

- Direct students to the first story problem in Lesson 16 BUI D Three Reads. Students should follow along while the problem is read a oud
- Ask students to record what is happening in the problem
- 3 For the second read, choral read the problem with the entire class
- 4 Ask the students to record the quantities they observe in the problem
- 5 For the third read, ask students to read the problem with a partner
- Ask students to record mathematical questions they could ask about this situation
- 7 Reveal to students the actual question for the story problem and ask them to write the question in the blank. How many hows will they need for all of their plants?
- B Ask students to work with a partner to show how they would organize the information in the problem and so, ve. Tell students there are much ple steps to sowing this story problem.
- 9. Can emiste dents to share dutither ideas



10 Ask students to work with a partner to complete Problem 2 using the Three Reads strategy

Answer Key for Three Reads:

- 1 Ninder E Shin, Unit also antholights to stripe 」「 、arts はS + ですターのJand ther 、 Je Pre ti a ないではられる arts 。 からじゅう も 1 いかい

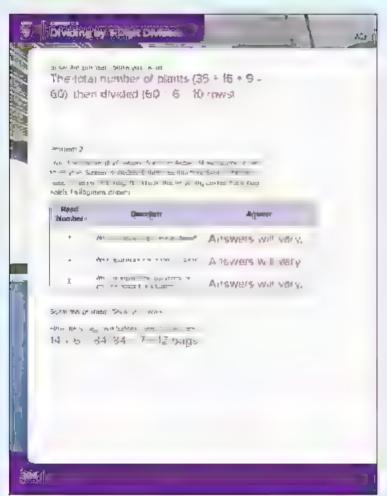
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Student Page 324



Show and Solve (25 mm)

- 1 Direct students to Lesson 16 Bull D Show and Sowe at diexplainito students that they will move around the room solving story problems. Remind students that some afthe problems may have multiple steps and may require addition, subtraction, multiplication, and/or division. Advise students that they may not have time to complete all of the problems, but showld fry to solve as many as they can.
- 2. A low students to war, around the room, select problems record the numbers of the problems they are so wing, and so we the problems

Answer Key for Show and Solve:

```
Tareformance, Alegra of Hegert at, edit
그 바루 나는 살아가는 살다
   150 4 + 5 - 12 H
   11 + _0 148
   146 4 - The .
  E. Jie Kyr Kyl + Tolding Aber
サイマンで、120 cshorteます。
   120 \times 3 = 360 page (in doc book)
  53 12 34 134 27 - 107 mines
   42" x 1 = 1 + 9 + mu sta
c. + 5: · rray, te
1 58" + 1 | 100 773 4F 154 1 4+ 1x
   dha jense
B (2x14)+(2x2) | 1 max a
 23444 ZEFT 1- FITTI
   1,84 Ex8,E
ب چار ۽ بيار ۽
 1 1164 + 1 - 184 - , Mark
```

CONNECT (7 min)

Comparing Answers

- [Direct students to Lesson 16 COMNECT Comparing Assewers, Ask students to compare answers with a partner who solved one of the same problems Encourage students to discuss the steps and strategies they used to solve the problem.
- 2. Allow students for opear this a few times with. different partners

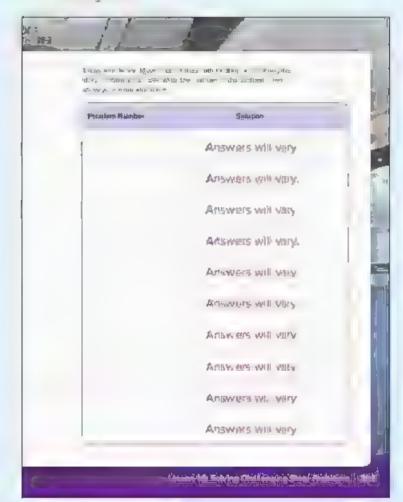
WRAP-UP (3 min)

Let's Chat About our Learning

Ask students to make stuations in their own lives when they might need to add, subtract, multiply, or divide Possible answers include earning money, spending money sharing with parts it is as : • ij trave i prayrig a game parilina part, la 🕠 are Frets = 51]

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Student Page 325

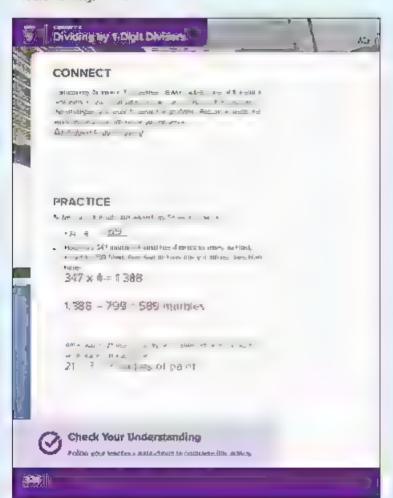






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PRACTICE

Direct students to Lesson 16 PRACTICE and have then complete the problems. Address stillen before and miscenceptions

Check Your Understanding

Sowe using the standard a gorrhm

1 171 cans were packed equally rito three boxes How many same were in two boxes? 171 - 3

In one month, Nour read 814 pages. In the same month, his sister read 3 times as many pages as Nour. How many pages did hour and his sister read aftogether?

Concept Check-In and Remediation

Lesson Overview

inithis lesson, students work to correct miscoinceptions and eners from Concept 2 Dividing by 1-Digit Divisors. First, administer the Concept Check in Once you have reviewed the quiz results, thoose remediation activities based on the needs of your students. Some recommendations are isted below, but the needs of your particular students should inform your choices. Students may work independently, in pairs, or in a small group with the teacher.

Lesson Essential Questions

- How can the relationship between multiplication and division be used to solve problems?
- How can we use our knowledge of place value to multiply and divide more efficient.
- How can we use different strategies to help us understand must digit multiplication and division?
- "how can we use mathito help us understand and solve real world problems"

Learning Objective

in this lesson

 Students will work to correct misconceptions and enors related to dividing by one-digit divisors

Grade-Level Standards

4.A.2 Use place value understanding and properties of operations to perform multidigit arithmetic

4.A.2.d Find who enumber quotients and remainders with up to found git dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division

4.A.2. [Listrate and explain calculations using equations or models



Materials List

Materials may vary



Preparation

Preparation may vary

DIGITAL



Concept Check-In and Remediation



Ou ck Code egimt4049



4.C.1.d So ve multistep word problems posed with whole numbers using the four operations, including problems in which remainders must be interpreted

4.C.1.e Assess the reasonableness of answers using mental computation and estimation stratedies including rounding



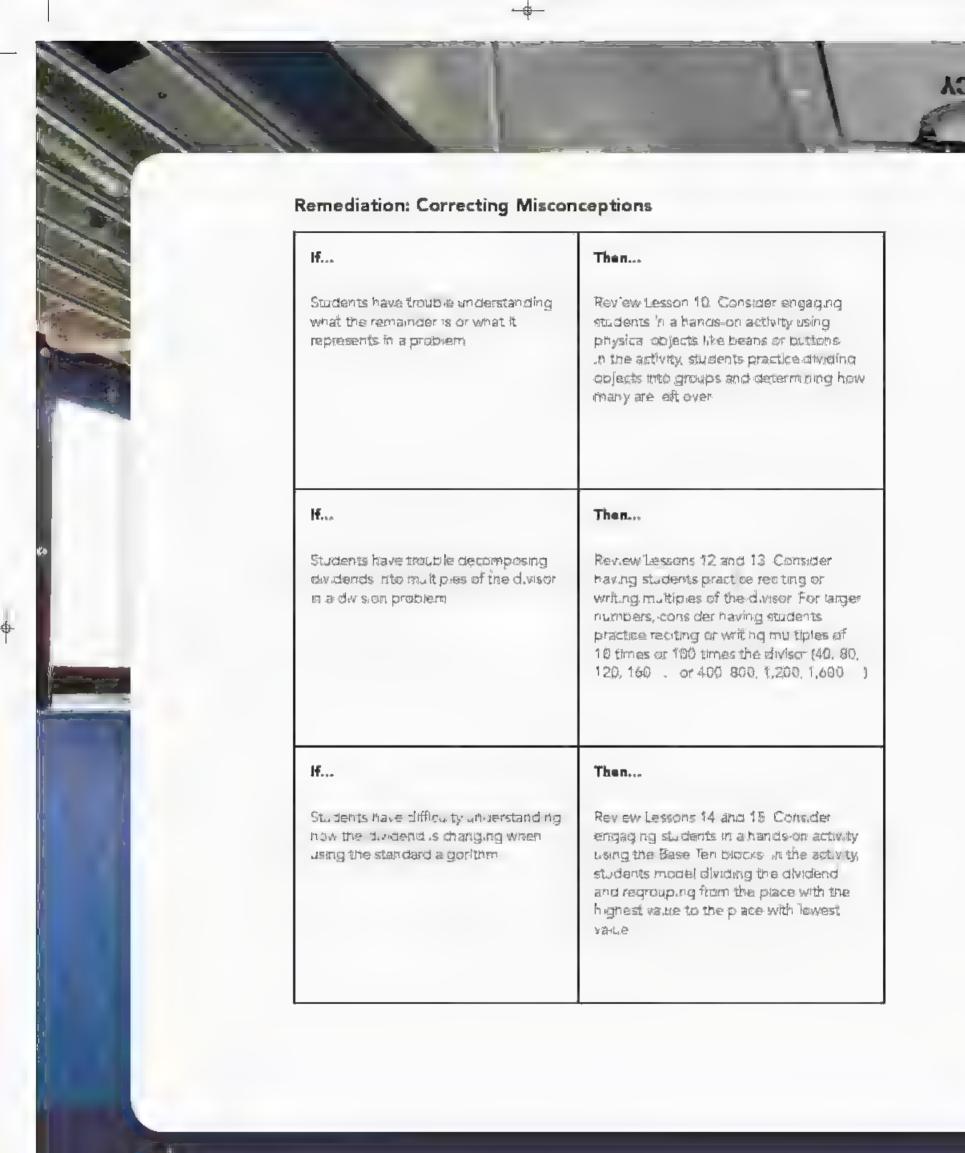
Vocabulary Check-In

Review.concept vocabulary as needed.

COMMON MISCONCEPTIONS AND ERRORS

- Students-may be confused by having a reminder in a division problem: They may try to proce the remainder into an existing group or Into an adultional group, both leading to वार्षक्रवालक इंग्लिमार्ग
- Students may have difficulty determining which multiples to use to start decomposing a dividend when using an area model.
- Students who are confused with what to do with the remainder may try to add if to or subtract the quotient.
- Students may be confused by how many zeros to put in a quotient lespecially when the rafated fait majudes a sara
- Students may have difficulty determining which multiples to use to start decomposing a
- Students may attempt to start dividing in the Ones place Hovever it is important to stantian ding in the place with the highestivable when using the standard a gorithm for
- Students may always put the first digit of the quotient above the first digit in the glyidend without considering the piece or value of the digiti.

Concept Check-in and Remediation





ORDER OF OPERATIONS

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Melagrate Litturgine

Unitial Order of Grateria States

ESSENTIAL QUESTIONS

- What strategies can be used to compute answers?
- Why does the order of operations in multistep problem-solving matter?
- How can we write equations to represent information in multistep story problems?



Video Questions

The unit 8 Opener Video. Order, introduces the rules that must be followed to solve problems rivolving two or more operations. Omar and Mariam take a school tip to a factory. They learn how the factory makes hars. The guide explains the order of each step and why the order matters. After the school tip. Omar and Mariam want to know what also has an order and where the order matters.



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HE 101 101 111

- What has an order in your school or home?
- Boes the order matter? What happens if the order is changed?
- In mathematics, are there any operations in which order matters? What are they? Give examples of what happens if the order is changed



Key Vocabulary

As students investigate real-world situations, they will develop an understanding of and be introduced to the following key vocabulary:

efficient, effective, order of operations, parentheses



Ou ck Code egm#4092

Unit 8 Order of Operations

Order of Operations

Unit Storyline



Unit 8 Order of Operations Storyline

The Order of Operations unit extends students' working knowledge of the order of operations. Students write equations to represent story problems and write story problems to represent given equations. Students apply these understandings to investigate how the order in which operations are performed can affect the outcome. To support earning, students observe video footage and solve real-world problems to enhance their understanding of order of operations.

Unit Standards

4.A.2	ise place value understanding and properties of operations to perform multidigit artification
4.C.1.d	Some multistap story problems posed with whole numbers using the four operations, including problems in which remainders must be interpreted
4.C.1.d.i	Like ethers in equal ons to represent unknown quantities
4.C.1.e	Assess the reasonableness of answers using menta, computation and estimation strategies including
4.C.1.f	Follow the standard order of operations to so ve equations with multiple operations

Unit 8 Structure and Pacing

If Mathematics instruction is based on 60 minutes/5 days a week, deliver the lessons as written in the Teacher Edition.

Concept 1: Order of Operations

Essential Questions

- What strategies can be used to compute answers?
- Why does the order of operations in multistep problem-solving matter?
- How can we write equations to represent information in multistep story problems?

Problem-Solving Strategies

Learning Objective

Lesson 1

 Students will apply strategies to solve adultion, subtraction, multiplication, and division problems

Student Learning Target

 can apply strategies to solve addition, subtraction, multiplication, and division problems

Which Comes First?

Learning Objective

Lesson 2

Students will use the order of operations to solve equations with two operations.

Student Learning Target

I can use the order of operations to solve problems with two operations

Order of Operations

Learning Objective

Lesson 3

 Students will use the order of operations to solve equations with multiple operations

Student Learning Target

I can use the order of operations to solve problems with multiple operations

Unit 8 Order of Operations

Order of Operations

Lesson 4

Unit Structure and Pacing cont'd

The Order of Operations and Story Problems

Learning Objectives

- Ştudentş will use the order of operations to solve equations with multiple operations
- . Students w., write and solve an equation to represent a multistep story problem

Student Learning Targets

- I can use the order of aperations to solve problems with multiple operations.
- I can write and so we an equation to represent what is happening in a multistep story problem

Concept Check-in and Remediation

Learning Objective

 Students will work to correct misconceptions and emors related to solving problems using the order of operations.

Student Learning Target

 "car» correct my misconceptions and errors related to solving property using the order of operations

Alternate Pacing Guides

If Mathematics instruction is based on 45 minutes/5 days a week, do the following:

Reduce ACCESS by 3 minutes

Require Buil D by 8 minutes

Real, se CONNECT by 2 minutes

Reduce WRAP-LP by 2 minutes

Strategies for reducing time in each section:

- · Discuss fewer examples
- · El minate Shou der Partner conversations
- Shorten class discuss ons
- Work with students to complete ACCESS problems

If Mathematics instruction is based on 45 minutes/4 days a week and 90 minutes 1 day a week, do the following:

Follow the 45 minute approach for the 45-minute days

Teach two 45-minute lessons on the 90-minute day

If Mathematics instruction is based on 90 minutes/5 days a week, do the following:

horease ACCESS by 5 minutes

Increase BU LD by 20 minutes

Increase CONNECT by 3 minutes

merease WRAP of by 2 minutes

Strategies for increasing time in each section:

- Discuss additional examples as needed
- Extend class discussions
- · Apply time for hands on work with man pulatives and models
- Provide additional practice problems for students who need additional practice
- Encourage students to share and mode, their problem-sowing strategies

Unit 8 Order of Operations

Order of Operations

Mathematical Background Knowledge

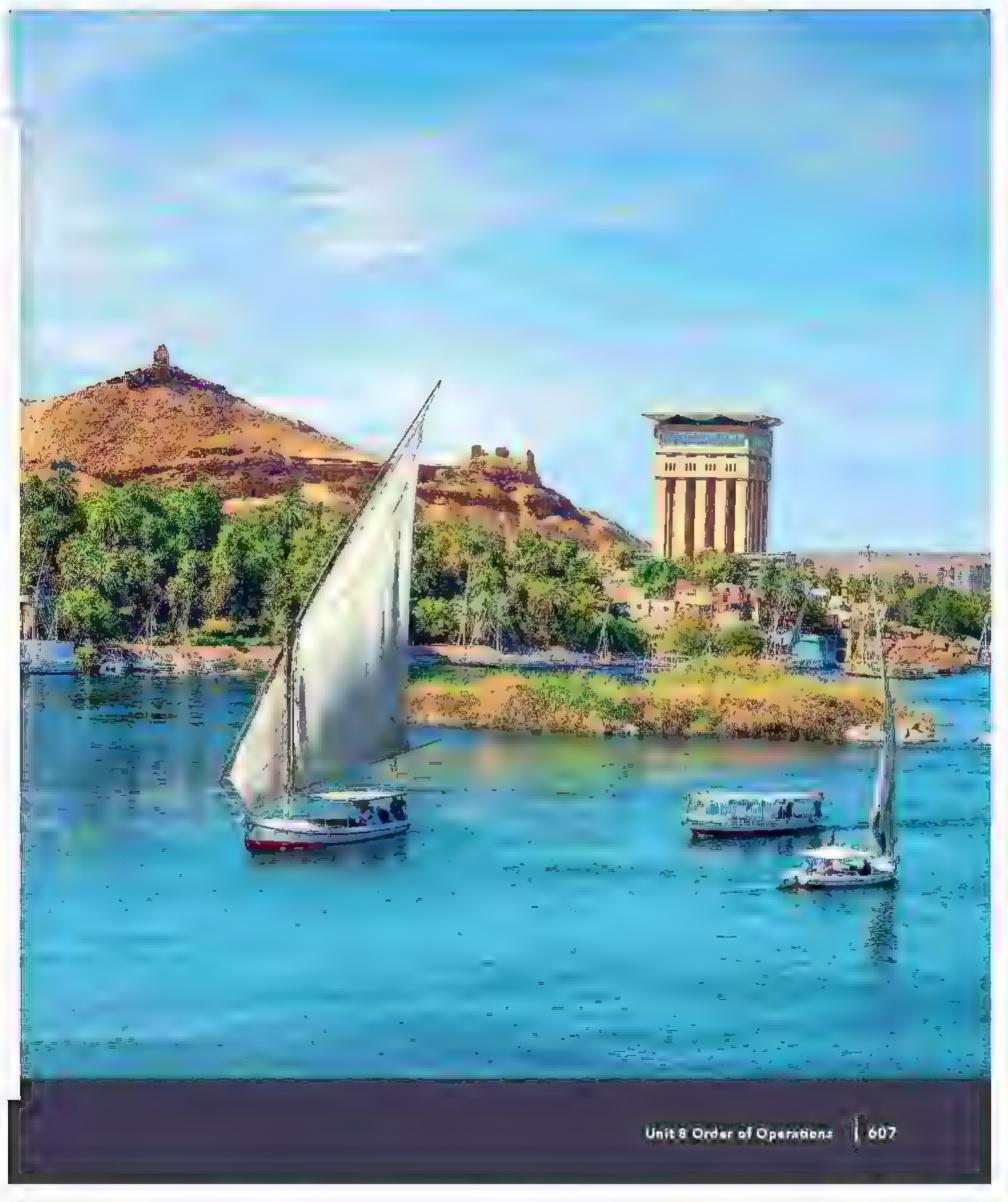
Order of Operations

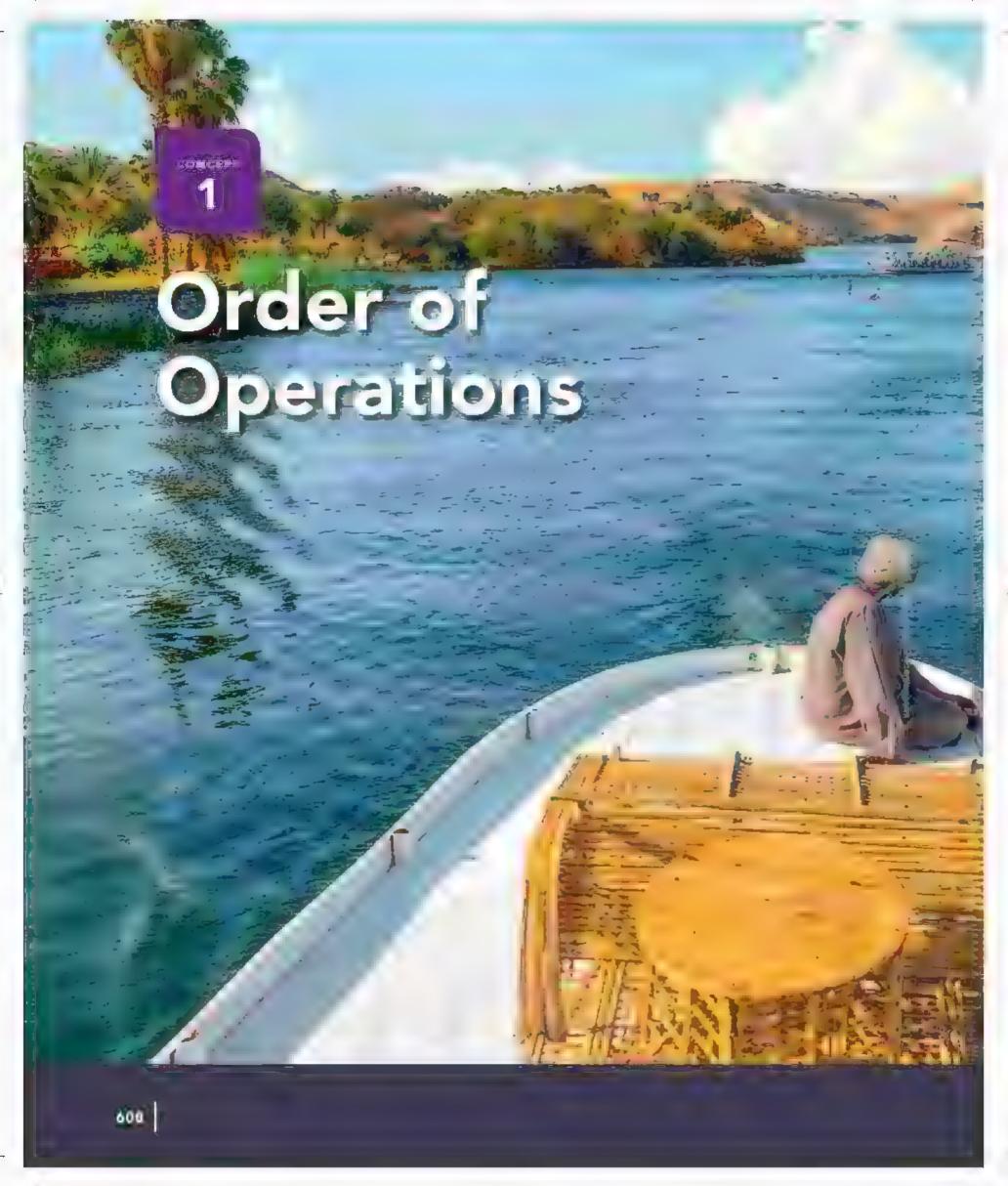
In's unit as a students to apply many of the studencepts they have learned in the first half of the school year. Those saids to but are not immediately solving complex audition, subtraction, multiplication, and division problems; applying the Associative Property of Ardithon and Multiplication developing strategies for solving story problems, as not effects to represent unknowns in equations and understanding the meaning of remainders in division problems. Students completely, a new concept the standard effect of operations.

In the standard order of operations, multiplication and division are performed first from left to right, and then add tion and subtraction are performed from left to right. Students come to anderstand that the order in which operations are performed when so ving a problem can affect the outcome. Therefore, the order of operations is essent at in ensuring that there is only one confect answer to a problem.

Students are first introduced to the standard order of operations in the context of problems with only two operations. Students then so we problems involving multiple operations. Students should recall that multiplication and division must be performed before addition and subtraction but the direction matters when problems have multiple operations. The order of operations states that multiplication and division are performed first from left to right, and then addition and subtraction is performed from left to right.

Students extend their understanding and application of the order of operations by writing a quations to represent story problems and writing a story problem to represent a given equation. Students consider the confect of each problem and develop an understanding of using parentheses to write equations. Parentheses are used to indicate what to do first when add non-or subtration needs to happen before multiplication of division. Students have seen parentheses in unit 5 when they applied the Associative Property of Multiplication to solve problems. Students think about efficiency through discussing when parentheses are needed and when they are not. This work prepares students for work in Printary 5, where students continue to use the order of operations with whose numbers and decimals and utilize parentheses, braces, and brackets in numerical expressions.







Concept Overview

In Concept 1: Order of Operations, students, earn the standard order of operations and apply it to some pare number problems and story problems. Students begin by reviewing problem-solving strategies and then some problems involving two operations. They extend their understanding to solve problems with multiple operations and complex story problems. Students, ecal the use of parentheses and earn the role of parentheses in the order of operations. Students are given a variety of opportunities to practice solving problems with multiple operations, including writing their own story problems to match algorithm equation.

Concept Standards

- 4.A.2 Use place-value understanding and properties of operations to perform multiggit antimetic
- **4.C.1.d** So we multistep story problems posed with whole numbers using the four operations, including problems in which remainders must be interpreted
- 4.C.1.d.i Use etters in equations to represent unknown quantities
- **4.C.1.4** Assess the reasonableness of answers using mental computation and estimation strategies including rounding
- **4.C.1.f** Follow the standard order of operations to some equations with multiple operations

Concept 1 Order of Operations

Concept Planner

Lesson Name	Materials for Lesson	Vocabulary Terms	Learning Objectives
1 Problem Solving Strattegles	 Unit 8 Lesson 1" information Gap Mumber Cards 	Effective	Students will apply strategies to solve addition, subtraction multiplication, and division problems.
2 Which Comes First?	 Order of Operations anchor chart 	Order of operations	Students Will use the order of operations to solve equations with two operations.
3 Order of Operations	Order of Operations anchorchars	Order of operations	Students Will use the order of operations with multiple operations.
4 The Order of Uperations and Story Problems	Order of Operations anchor chart.	Efficient .	Students Williamse the
		Parentheses	erger of operations to solve equations with multiple operations • Silutents will write and solve an equation to represent a multistep story problem

Common Misconceptions and Errors	Opportunities for Formative Assessment
 Students may have difficulty setting up problems and performing argorithms properly. While students should be working towards using the correct a gorithms, they should use strategies they are comfortable with at this time. 	Strategres We Know, So ve It, Writing About Meth, Practice, Check Your Understanding
Students may always try to complete the calculations from with to right without looking parefully at the operations.	Number Talk, Exploring the Order of Operations, Writing About Matri, Practice, Check Your Understanding
 Students may always try to complete the calculations from left to might without tooking carefully at the operations. Students may have difficulty understanding the order of the steps when working through an equation with multiple operations. 	Working Left to Right, Find the Answer, Who is Correct?, Plactice. Check Your understanding
 Students may follow the order of operations without considering the context of the problem. Students may unnecessarily use pareinheses to indicate what to do first in an equation. For example, they in ght write 25 x 5 = 19 as (25 x 5)= 19. While this is not incorrect, this is not the most efficient way to write the equation. 	Number Talk, The Order of Operations and Story Problem, Bractice, Check Your Uniderstanding

Concept 1 Order of Operations



Lesson	Materials for Lesson	Vocabulary	Learning
Name		Terms	Objectives
oncept heck-in and emediation	Materials may yary	Remey concept vocabulary as riseded	Students Will work to correct in sconcept, ons and errors is atea to so ving problems using the order of operations

Opportunities for Assessment:

maddition to the assessment opportunities included in this chart, each concept will include a Concept Check-in



- Students may always try to complete the cabulations from left to night without looking carefully at the operations
- Students may have difficulty understanding the order of the steps when working through ar equation with multiple operations
- Students may follow the order of operations without considering the context of the problem
- Students may unnecessarily use parentheses to indicate. what to do first in an equation. For example, they might write 25 x 5 = 19 as (25 x 5) - 19. While this is not incorrect. this is not the most efficient way to write the equation



Opportunities for Formative Assessment

Cencept 7 Order of Operations

LESSON 1 Problem-Solving Strategies

Lesson Overview

to this essen, students revisit and practice strategies for addition, subtraction, multiplication, and division and build fluency in so ving problems ethic entry. This step is essential in preparing students to so veint instepproblems in which the opter of operations matters.

Lesson Essential Question

What strategies can be used to compute answers?

Learning Objective

in this lesson

Students wild programme and trop subtraction, multiplication, and division problems

Grade-Level Standards

4.A.2 (se place value "interstall ding and properties of operations to perform multidigit arithmetic

4.C.1.• Assess the reasonableness of answers using mental computation and estimation strategies including rounding



effective, efficient



Materials List

 Light 8 Lesson II Information Cap Number Cards (I card per atudent)



Preparation

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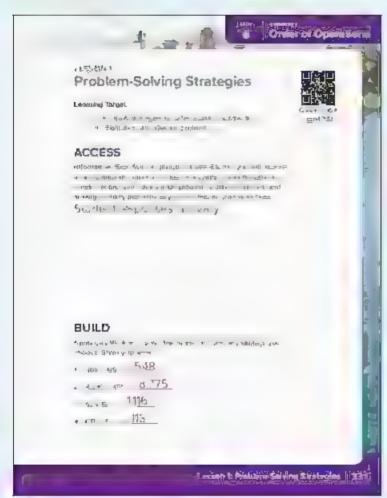


Problem-Solving
Strategies



Qu ck Code egrmt4093

Student Page 331



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

Students thay have artificulty setting up problems
and performing algorithms properly. While
students should be working towards using the
correct algorithms, they should use strategies
they are confoliable with arthus time.

Information Gap

- f. Te students they will be working in small groups to solve problems. Explain that each student will get a card—either a number card or an operation card.
- 2 Divide students into groups of three (of let them select their own groups). Distribute information Gap Number Cards to students () care per student). Ask students to work together to create a problem, record it, and solve it.
- Once a small group has solved their problem, the students should form new groups. The new group should work together to create a new problem, record it, and solve it.
- 4. After about 5 injurites, instruct students to stop and return to their seats. Ask a few students to share the problems they made and their solutions.

Lesson 1 - Problem-Solving Strategies



BUILD (40 min)



Strategies We Know (15 min)

- 1. Remind students that they have learned a muriber of ways to solve addition. subtraction, multiplication and division problems
- 2 Direct students to Lesson 1 BuilD Strategies We Knew Asil students to work independently to some Problems 1-4 using any strategy they knew
- 3 Once students are finished, ask them to share their problem-solving strategies with their Shopider Partner if students disagree on an answer, they should circle the problem.
- 4" Ask arfaw students to share a problem-solving strategy for each problem on the board.

 Allow students to consectment work in their Student Edition.
- 5 Remind students that, as they learn problem-solving strategies, they should practice applying them and find the strategies that are most effective and efficient for them.

Answer Key for Strategies We Know:

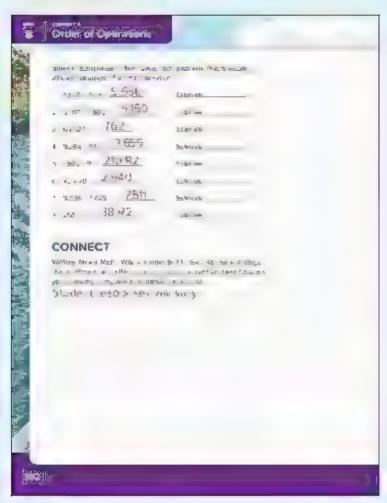
```
7 2 x 3 = 11
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Solve It (25 min)

1. As students to turn to tesson 1 Bull. Diso we it and read the directions. Allow students to work with a partner or a small group to some Problems 1–8. As students are working, walk around and observe the problem-solving stategies students are using. Afe they choosing afficient and affective strategies? Who may need additional ties of many students are stateging, herewisely strategies and algorithms on the board of students have onto time, running them that they can check their answers using opposite operations.

910

Student Page 332



With about 8 m nutes remaining, go over the correct answers with students. Discuss why students may have had different estimates. If necessary, explain that estimates may differ depending on the estimation strategy used and the place to which each student rounded the only not humber's. Allow students to correct their work in their Student Edition

Answer Key for Salve It

CONNECT (7 min)



Writing About Math

Elirect students to Lesson 1 CONNECT Writing About Wath and ask them to respond to the prompt Students show a recount to that efficients lated exto the time and that effect a little recorder the TIMEST WASHELF ABOVE HITTE

WRAP-UP (3 min)





Let's Chat About Our Learning

Ask students to share their responses to the Whiting About Math prompt, if no students mention the mportance of being able to work quickly and getting a correct answer every time, ask questions to prampt their th Inking

PRACTICE

Direct students to 'Lesson' † PRACTICE and have them complete the problems. Address student errors and this conceptions

Check Your Understanding

So we using any strategy Show your work

- 1 18 x 52 = 3 or
- 2 2,451 /22 -1 .4
- 3 561 + 4 = +1 -1
- 4. 4.902 * 1.725 = 10 627

PRINT





Materials List

Order of Operations anchor chart

Order of Operations

Parentheses Multiplication and Division (left to + grit) Addition and Subtraction (left-to-right)



Preparation

Make avarge copy of the Order of Operations anchor chartito display.

DIGITAL



Which Comes First?



egm:4094

LESSON 2 Which Comes First?

Lesson Overview

In this lesson, students learn the standard order of operations and apply their new learning to so veproblems involving two operations

Lesson Essential Questions

- What strategies can be used to compute answers?
- Why does the order of operations in thu tistep problem-sulving malter?

Learning Objective

In this lesson

 Students will use the order of operations to solve problems with two operations

Grade-Level Standards

4.C.1.f Fellow the standard order of operations to so ve equations with multiple operations



Vocabulary Check-in

another of operations

Lesson 2 - Which Comes First? 619

ACCESS (10 min)



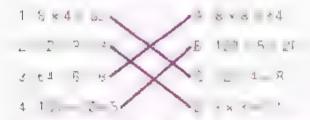
TOPHISCO, HETCHICE TO ATLE

 Students may always try to complete the calculations from left to light without looking carefully at the operations.

Number Talk

- 1 Direct students to Lesson 2 ACCESS Number Tauand ask students to work independently to so verthe problems
- 2 Once students have finished, ask them to work with a partner to draw a the connecting equations that are related to one another
- 3. After a few minutes, ask students to choose at east one matched pair and write another equation that well, dice related to that pair
- 4 Ask volumeers to share which connections they made and the equations they came up with on their own

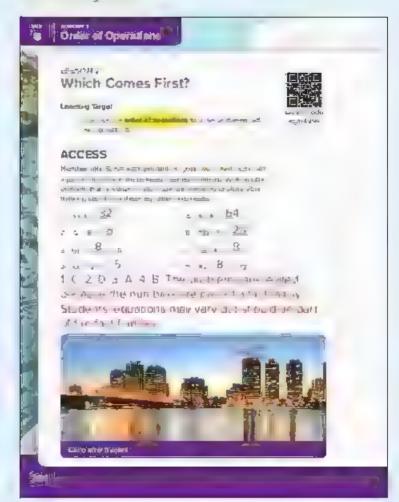
Answer Key for Number Talk:



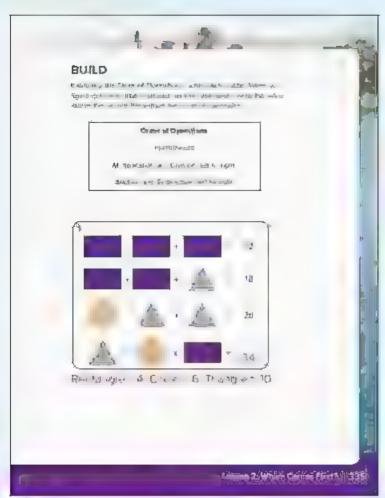
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FEACHER NOTE the centil carbée about fact families saling madellication and desirable in Primar we they are at letter attend at every the fact related and, now they interview when there at was missing Studients should recall the Communation of the Multiplication when working their own related problem.

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Student Page 335



BUILD (40 min)



Exploring the Order of Operations

- 1 Write 4 + 5 × 6 and 5 × 6 + 4 on the board and ask students to so, ve the two problems
- After a few minutes, asit students to compare their answers with a partner
- 3 Ask volunteers to share their answers with the class Students may say that 4 + 5 × 6 ± 54 and that 5 × 6 + 4 is 34. Accept both answers at this time
- 4. Foint out that both problems have the same numbers and the same operations but seem to have different answers. Ask students to turn to their Shoulder Parther to discuss 4 they think it is possible that these two problems could have different answers.

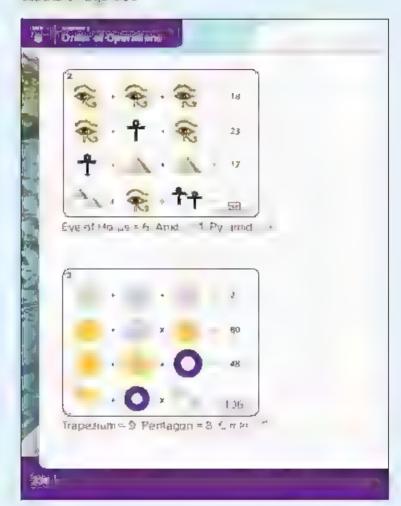
THE A F JOIE Students standard of the 18 to 18 t

- 5 Explain to students that when a problem has more than one operation, there are rules that help them make decisions about the order of operations.
- 6. Display the Order of Operations anchor chart. Explain to students that they will not be solving problems with parentheses or exponents at this time, so they can move down the order of operations to multiplication, division, add tion and subtraction. Tell, students that the order of operations states that multiplication and division must be done before addition and subtraction.
- 7 Explain that because the order of operations states that the multiplication in the proplem 4+5 × 6 must be done first even if it is not written first in the problem, both problems eq.(3). Briefly mode solving both problems on the board

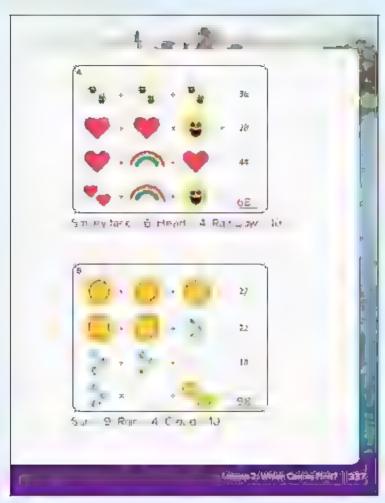
Lesson 2 - Which Comes First?

- B. Direct students to Lesson 2 BuilD Exploring the Order of Operations Point out that the Order of Operations anchor chart information is in their Students Edition. Students may refer to it at any time to help them so we problems. Explain to students that they will practice applying the order of operations by solving puzzles.
- The pictures in the puzzle eachirepresent numbers Ask students to think about the pictures in the first row and discuss what they notice.

 The 3 numbers again 12 when added to getter
- 10 Since each picture is the same, each picture must represent the same number. So, each rectange in this prop em represents 4. Ask students to write 4 above each rectangle.



Student Page 337



- 11 Ask students to continue working to solve Problem 1 Remind students to follow the order of operations
- 12 Once students have fireshed Problem 1 (or if students are student), ask them to discuss the strategies they used Go eyer the answers together.
- 13. After cleaning up misconceptions and answering students' clarifying quest, this, allow students to work in small groups to so ve Problems 2.5.

Terrore E. - To per Terrore Terrore The sectors of the period that period the period that period the sectors is a sector of the period that period the sectors is a sector of the period that period the sector of t

Lesson 2 - Which Comes First?

CONNECT (7 min)



Writing About Math

Direct students to lesson 2 CONNECT Writing About Math and ask them to respond to the prompt

Answer Key for Writing About Math:

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WRAP-UP (3 min)





Let's Chat About Our Learning

Ask students to share their thinking about the order of operations with the class. What is still confusing? How did they overcome challenges when so and the picture puzzies?

PRACTICE



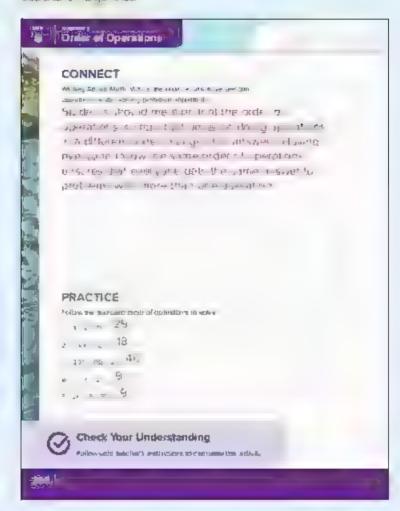
Direct students to Lesson 2 PRACTICE and have them complete the problems. Address studelit errors and misconseptions around very large humbers

Check Your Understanding

Follow the standard order of operations to so ve

- 1 3×16-4=44
- 2. 5±5±5×4 = 00
- 3. 9×6 10=44
- 4 14 + 7 + 20 -2
- 5 20 * 14 ÷ 7 = 22

PRINT





DIGITAL



Order of Operations



Quick Code egitti4095

LESSON 3 Order of Operations

Lesson Overview

In this lesson, students follow the order of operations to so ve equations with intiffip e operations. This practice is essential in helping students remember and apply the order of operations as they seek accoming and fluency in computation.

Lesson Essential Questions

- What strategies can be used to compute answers?
- Why does the order of operations in multistap problem-sowing matter?

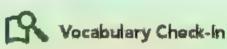
Learning Objective

in this lesson

 Students will use the order of operations to solve equations with multiple operations.

Grade-Level Standards

4.C.1.f Follow the standard order of operations to some equations with multiple operations



Review wocabulany as needed

Lesson 3 - Order of Operations

ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERPORS

- Students may always try to complete the calculations from left to might without looking carefully at the operations.
- Students may have afficulty understanding the order of the steps when working through am equation with multiple operations.

Which Does Not Belong?

- 1 Direct students to Lesson 3 ACCESS Which Does Not Beyong? and do ever the directions together Be sure students understand the different steps
- 2 Ask students to work independently to complete the activity
- 3 After about 5 minutes ask students to share their responses with a partner. Then, ask volunteers to share their thinking with the diess

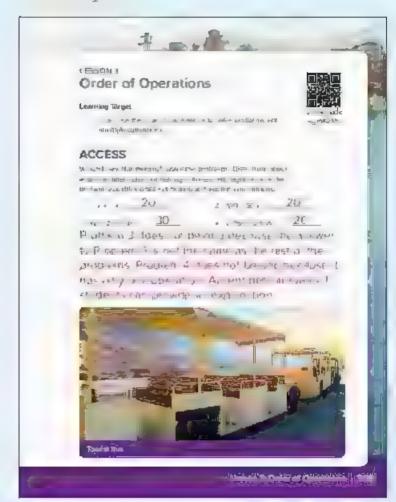
Answer Key for Which Does Not Belong?:

Problem 3 does not ne rather and desard.

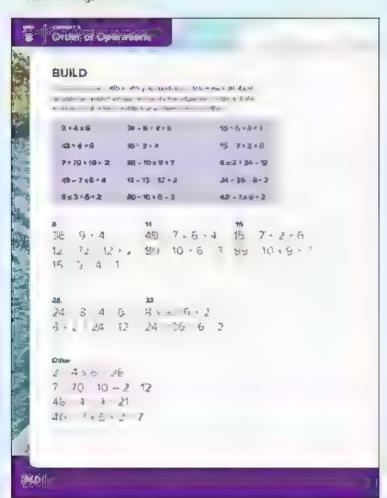
Problem 4 does not perchapted and the problem and th

- 1 1 x 4 4 1 1
- 1 100 -30 × 1 20
- 1 Da # (1 50 31
- 4 200 2300 26

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Student Page 340



BUILD (40 min)



Working Left to Right (15 mm)

- 1 Write 3 x 9 7 on the board Asi students to work with their Shoulder Parther to solve the problem
- 2 Point out to students that when for owing the order of operations, it is important to work efficiently.

 Once students surve 3 × 5 they should so ve 27. 7 and not 7. 27.
- 3 Write 10 x 3 x 9 = 7 = ____ on the board Asistudents to talk to their Showder Parther about how this problem and them solve the problem
- 4 Ask students to share their answers and explain their thinking (Do not revea the correct answer yet)
- 5 Expedin to students that the order of operations states that multiplication and division must be performed first, but that they must also be performed from left to right So. 10 × 3 = 30, 30 × 9 = 270, and 270 7 = 253
- 6 Write 50 + 42 + 6 12 = _____ on the board. Ask students to give a Thumbs-Up when they think they know what to do first to solve the problem. Students should _____ 4 ___ 1 is t
- 7 Rewrite the problem as 50 + 7 12 ____ below the original problem
- B Ask students to give a Thumbs-Up when they think they know what to do next. Explain to students that the order of operations states that addition and subtraction must also be performed from left to right.

 In enable—the next step is 50 ± 7.
- 9 Rewrite 57 12 = _____ below the last problem
- 10. Ask students to solve the problem and give a Thumbs-Up when they have the arriver Fourth the order of persons to the order of persons to the order of persons to the order of the order

Lesson I . Order of Operations

Find the Answer (25 MHA)

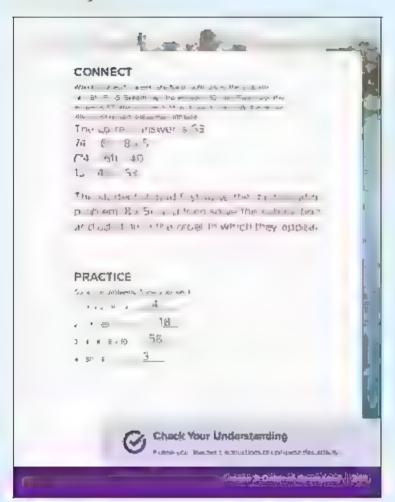
- Direct students to Lesson 3 Bu. ID Find the Answer Explain to students that sume of the problems have the same answer Asia students to work with a parther to solve the problems and rewrite each problem under its answer if the ariswer is not insted, students should write the problem under "Other"
- 2 Allow partners to work for about 5 minutes, and then have students find a new partner to work with Partners should compare their answers so far and continue working for another 5 minutes
- As students to return to the rown seats and reflect on the activity. Ask students if they a ways agreed with their partner's answers. Remind students that this is why we have the order of operations. It ensures that everyone gets the same miswer when they solve a problem, with those than one operation, if there is time, go over the problems that students wrote utilizer. "Other"

Answer Key for Find the Answer:

```
3 1+4 18
12 7. 1 + 1 2
15 5 + 4 + 1 1 8
41 "x1+4 1
90 10 + A J 11
16
1F + 7 + 7 16
6 c 16 x c+ 1 11/5
4 :=4+6
*** + I+ 2 22
M K . + 5 + _ = 2 1
24 + 30 0 + 2 32
Other
3. 3 x L + T
7,70 1, -12
46 4 + 1 = 19
```

4, *5+2

Student Page 341



CONNECT (7 min)



Who Is Correct?

Ask students to turn to Lesson 3 CONNECT Who is Correct? and respond to the prompt.

Answer Key for Who Is Correct?:

The correct answer is 53.

14 -1+8x5

154 OF + 40

13+46 -3

The deplet should first so we the mith proation problem (8 × 5), and then so ye the subtraction and addition in the order of which they appear

WRAP-UP (3 min)





Let's Chat About Our Learning

Ask some students to share their thinking about the CONNECT area on with the diass. If necessary, review the order of operations and the rule of completing computation from left to right.

PRACTICE

Direct students to Lesson 3 PRACT CE and have them complete the problems. Address student errors and miscondéptions

Check Your Understanding

Salve the problems. Show your work

- 1 190 = 10 + 5 + 4 28
- 2. 36 = 15 ± 18 ± 3 = 2
- 3 13 + 7 20 5 = 14
- 4 35 + 12 4 x 3 · · · ·



The Order of Operations and Story Problems

Lesson Overview

further lesson, students apply what they have earned about the order of operations to represent and some multistep story problems.

Lesson Essential Questions

- Why does the order of operations in multistep: grob erg sowing imatter?
- How can we write equations to represent information information story problems?

Learning Objectives

In this lesson

- Students will use the order of operations to so ve eguations with my tiple operations.
- Students will write and solve an equation to represent a multistep story problem

Grade-Level Standards

4.C.1.d Solve multistep story problems posed with whole numbers as not the four specificons, including problems in which remainders must be interpreted

4.C.1.d.i Use letters in equations to represent unimowr quantities

4.C.1.f Follow the standard order of operations to solve equations with multiple operations



efficient, parentheses



Materials List

Order of Operations anchor chart

DIGITAL



Lesson 4

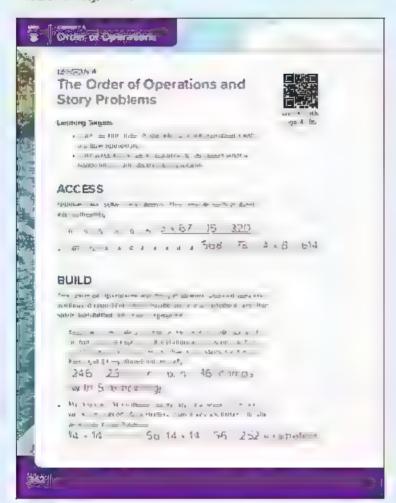
The Order of Operations and Story Problems



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630

Student Page 342



ACCESS (10 min)



COMMON MISCONCEPTIONS AND ERRORS

- Students thay follow the proce of operations without considering the context of the problem.
- Students may unrecessarily use parentheses
 to indicate what to got first in an equation. For
 example, they might write 25 × 5 19 as (25 ×
 5) 19. While this is not incorrect, this is not the
 most efficient way to write the equation.

Number Talk

- Direct students to Lesson 4 ACCESS humber fall Remind students that they have talked about being efficient before. When we are efficient, we write and so we problems quickly but accurately Ask students to rewrite each problem so it can be sowed more efficiently.
- 2 Give students a few minutes to rewrite the equations if necessary encourage students to focus on the repeated operations.
- Ask students to share their thinking with their Shoulder Partner.
- 4. Ask volunteers to write their problems on the board Ask if any students had different ideas on how to rewrite the equations and allow them to share their approach.
- 5 Ask students to a scuss what they notice about the different equations

Answer Key for Number Talk:

Lasson 4 - The Order of Operations and Story Problems



BUILD (40 min)



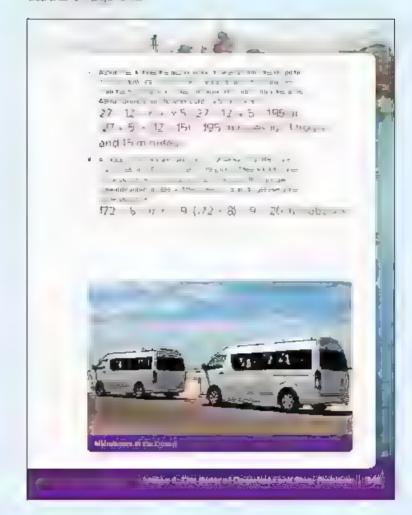
The Order of Operations and Story Problems

- 1. Remind students that they have a ready learned a great deal of mathematics in the first half of the school year. They have learned how to solve complex adds on, subtraction, that plication, and division problems, how to apply the Associative Property of Addition and Multip leation, how to use different strategies for solving story problems, how to use letters to represent unknowns in equations how to find remainders in division problems, and how to apply the order of operations. Students about fee proposed at they have learned Today, they we put all of those skyls together to solve proplems.
- 2 Direct students to Lesson # BUILD The Order of Operations and Story Problems. Explain to students they will be using the order of operations to represent what is happening in each story problem.
- Remind still dents about the Three Reads strategy and give them time to read Propiem 1. The first time they read, they should think about what is happening in the attistion. The next time they read, they should to no about what the numbers are telling us. The third time they read, they should think about what they got need to do to solve the problem.
- 4. Ask students what happens first in the problem and how they might represent that using numbers and symbols.

 **Boah an has 440 tan ps a _ neep = 15 of them

 This can be represent ad as 144 = 25.
- 5 Write 246 25% in on the board. Remind students that they can write a letter to represent missing numbers in problems.
- Ask students to turn to their Shoulder Partner to discuss what happens next in the problem 4bid. Iah shares his stamps equally among o finence.

PRINT



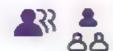
- 8. Write 246 25 = 6 on the board. Ask students to give a Thilmbs-up if they agree and a Thilmbs-Down if they disagree that this equation represents what happens in the story problem. Ask a few students to share their thinking.
- 9 Fxp.a ninst, at much the problem appears to represent what happened in the problem, the order of operations states that the division portion must be so yet first thing that happened in the story was subtraction (keeping some of the stamps)
- 10 Remind students that when they earned the Associative Property of Addition, they also regimed that mathematicians use parentheses to indicate what to do first in a problem
- 11 Circle students attention to the Order of Operations anchor chart. The first operation on the chart involves parentheses. Operations in parentheses are solved first, even before multiplication or division. So we can use parentheses to make sure the subtraction portion is solved first.
- 12 Write (246 25) + 6 on the board. Ask students to so ve the problem in their Student Edition. Ask a student to explain the answer (the number of shared stamps and the meaning of the remainder).
- 13 Ask students to work in pairs or small groups to solve Problems 2.5, writing equations that represent each story problem and follow the order of operations. Students may choose what her or not they use atters in tagin problems.
- 14 As students work, walk around and observe their problem solving strategies. Ask questions to prompt their thinking, if needed. Take note of students who may need additional instruction and support. If many students are struggling, stop and work with the classite solve each problem. Ask students to provide reasoning and next staps whenever possible.
- 15. With about 5 minutes left in BuilD, go over the eguations and answers with students

Answer Key for Order of Operations and Story Problems:

- The first of the state of the s

Lasson 4 . The Order of Operations and Story Problems

CONNECT (7 min)



Writing My Own Problem

- 1. Direct soudents to Lesson & CONNECT WHENG My Own Problem and read the directions around Discuss with students same ideas they could use to write their story problems (for example, food, people, games, toys, measutements, money).
- 2 Ask students to write a story problem that matches. the nambers and symbols shown

Answer Key for Writing My Own Problem:

Students' story problems will vary but should be able to be solved by (BD - 36) - 4

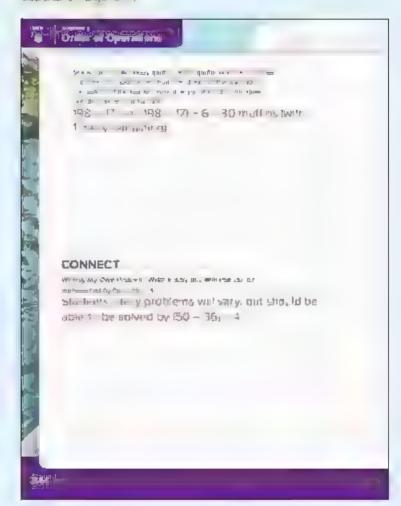
L + Eithn rysing this accepty as a The test of the state of the Mile State of the state of t the state of the same of the state of the st i. A the time in stallence work white. restricted one and etres that a line ton the

WRAP-UP (3 min)

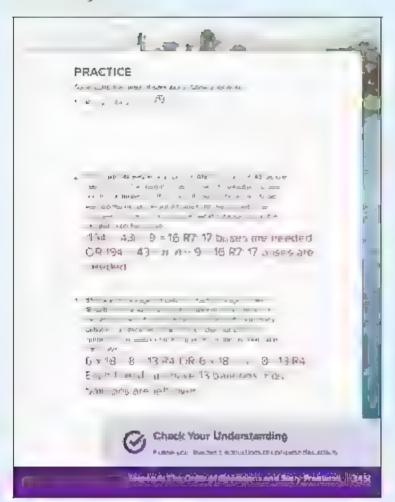
Let's Chat About Our Learning

As students to discuss the challenges of writing autory problem to metch a given equation how does the order of operations help them write and solve these kinds of problems?

PRINT



Student Page 345



PRACTICE

Direct students to Lesson 4 PRACTICE and have them complete the problems. Address still enteriors and impressions

Check Your Understanding

Some using the order of operations. Show your work

$$1 - 17 \times (15 - 8) + 2 = 121$$

2. Mohammed ran 8 x logreters on Saturday and twice that amount on Sunday. He ran 8 kilometers eas on Monday than he did on Sunday. How many kilometers of the run on Monday? Use rumbers and symbols to represent what is happening in the problem, and then so ve

There were 86 people on the pitch. Of the 86 people, 9 of them were coaches, and the rest wanted to play football, if they wanted to form teams of 11, how many teams could they make? Use numbers and symbolis to represent what is nappening in the problem, and then solve in the 11 teams. That = 9 = 0.0 = 11



Concept Check-In and Remediation

Lesson Overview

In this essan students work to correct misconceptions and errors from Concept 1 understanding the Order of Operations. First, administer the Concept Check-mignifications you have reviewed the quiezresults, choose remediation activities based on the needs of your students. Some recommendations are listed in the chart, but the needs of your particular students should inform your choices. Stadents may work independently, in page, or in a small group with the teacher

Lesson Essential Questions

- Why does the arder of operations in multistep problem-solving matter?
- How-can we write equations to represent information in multistep story problems?
- What strategies can be used to compute answers?

Learning Objective

in this lesson

 Students will, work to correct misconcept one and errors related to sowing problems using the order of operations

Grade-Level Standards

- 4.A.2 Use place value understanding and properties of operations to perform mutile git arithmetic
- **4.C.1.d** Solve multistep story problems posed with whole numbers using the four operations, including problems in which remainders must be interpreted
- **4.C.1.d.i** Use etters in equations to represent unknown quantities



Materials List

Materials dray vary

DIGITAL



Concept Check-In and Remediation



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4.C.1. Assess the reasonableness of answers using mental computation and estimation strategies including rounding

4.C.1.f Follow the standard order of operations to seve equations with multiple operations



Vocabulary Check-In

Review concept vocabulary as needed.

COMMON MISCONCEPTIONS AND ERRORS

- Strongers may sliveys try to complete the calculations from left to night without looking carefully at the operations.
- Students may have difficulty understanding the order of the steps when working through an education with multiple operations
- Students may follow the order of operations without considering the content of the हार वेंद्राच्
- Students may unnecessarily use parentheses to inclicate what to do first in an equation for example, they might write 25 = 5 = 19 as (25 × 5) 19. While this is not incorrect. this is not the most efficient way to write the equation:

Concept Chack-in and Remediation



Remediation: Correcting Misconceptions

lŧ...

Students have difficulty understanding the order of the steps when working through an equation with multiple operations

Then...

Feview Lessons 2 and 3. Consider having students write numbers above the equation to help the determine which operation comes first, second and so on. It may also help students to high got what they need to complete first this requation, and then use their finger to track how they will solve the equation from left to hight

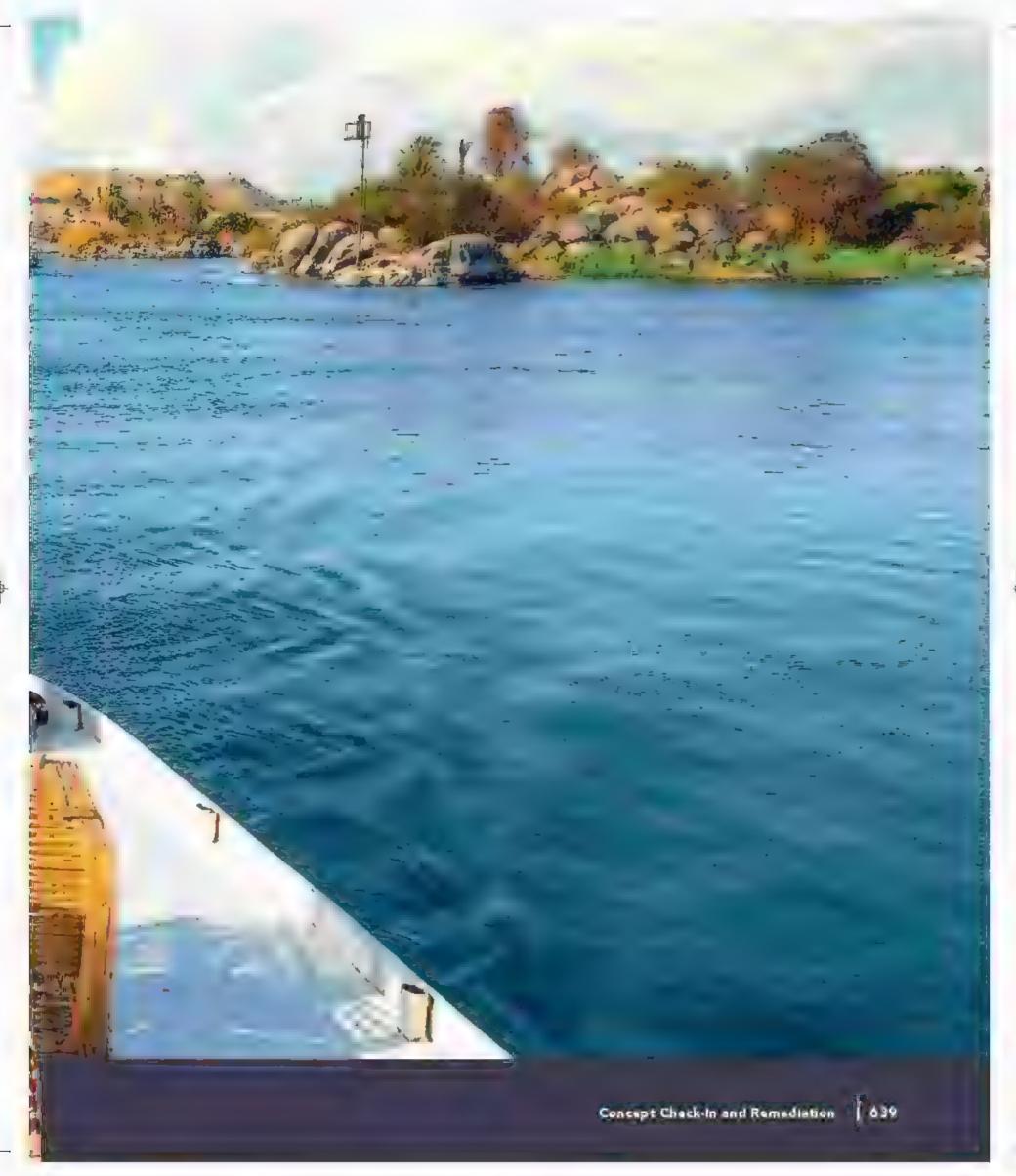
If . . .

Students do not consider the context of the problem when writing equations to represent multistep story problems

Then...

Review Lesson 4. Consider having students repead problems visualize, or ad out what is happening in the problem, and them we to the steps they would need to use to solve the problem. Students may also benefit from doing a line-by-line analysis of the problem. Provide additional practice using the Three Reads problem-sowing strategy.







Primary 4 Resources

- Lesson Blackline Masters
- Glossary
- Index







Unit 1, Lesson 1 Review Digit, Numeral, Number

Sorting Cards

Instructions: Photocopy and cut apart or recreate on large squares of paper.

two hundred	35,646,788
three thousand, four hundred twelve	5
	forty-nine



Unit 1, Lesson 1 Review Digit, Numeral, Number

Sorting Cards, continued

Instructions: Photocopy and cut apart or recreate on large squares of paper.

45,646	70,000,000
1	eight
one million	Answer Key: two hundred; 35,646,788; three thousand, four hundred twelve; 5; forty-nine; 45,646; 70,000,000; 1; eight; one million

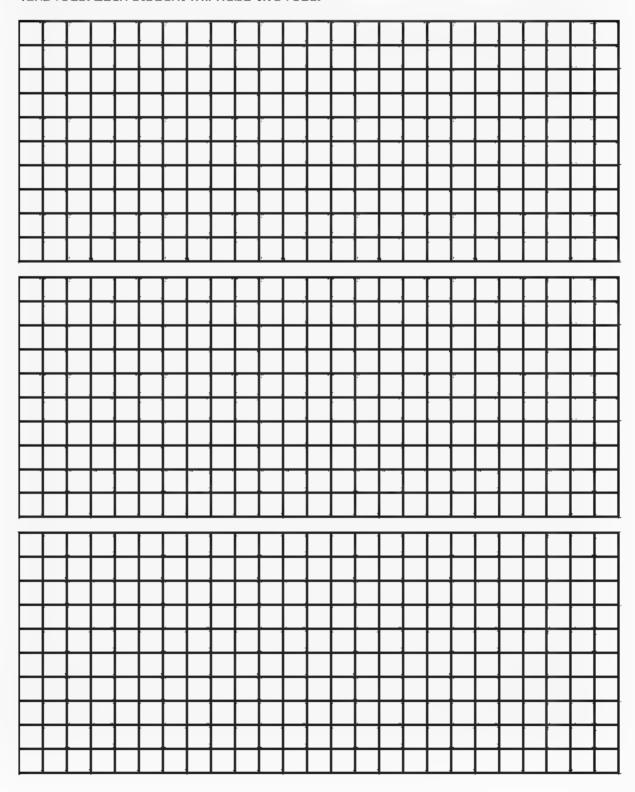
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Unit 1, Lesson 3 **Changing Values**

Tuns Rods

Instructions: Photocopy and cut apart along the vertical lines to create Tens rods. Each student will need two rods.





Unit 1, Lesson 3 Changing Values

Large Digit Cards

Instructions: Photocopy one set for the teacher and cut apart.

1	2	3
4	5	6
7	8	9





Unit 1, Lesson 4 Review Comparing Values

Large Base Ten Manipulatives

Instructions: Photocopy and cut out one set for the teacher.

Hundreds flats -- 100

Tens rods ~ 10

Cut some Tens rods into squares to create Ones cubes.

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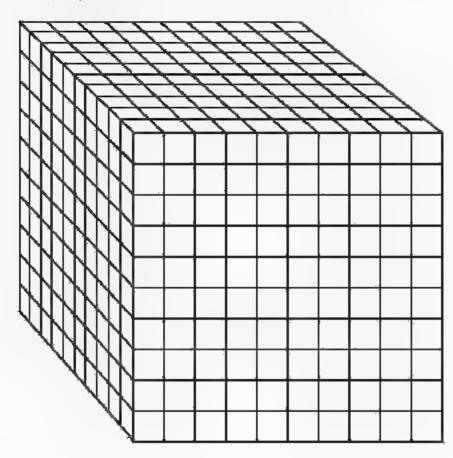


Unit 1, Lesson 4 Review Comparing Values

Large Base Ten Manipulatives, continued

Instructions: Photocopy and cut out one set for the teacher.

Cube - 1,000









Unit 1, Lesson 6 Composing and Decomposing

We Have, Who Has? Cards

Instructions: Photocopy and cut apart.

We have 1,223,643,509 Who has Six milbard, two hundred twenty million, four hundred sixteen thousand, one?	We have 6,220,416,001 Who has A number with a digit worth 800,000?
We have 78,812,934 Who has The word form of 584,453,238?	We have Five hundred eighty-four million, four hundred fifty-three thousand, two hundred thirty-eight Who has The expanded form of 404,000,040?
We have 400,000,000 ± 4,000,000 ± 40 Who has A number with a digit worth 10?	We have 6,230,904,010 Who has 10,000 more than 7,323,134,000?
We have 7,323,144,000 Who has Four million, six hundred thousand, nine hundred ninety-nine?	We have 4,600,999 Who has The expanded form for 5,333,090,100?





Unit 1, Lesson 6 Composing and Decomposing

We Have, Who Has? Cards, continued

Instructions: Photocopy and cut apart.

We	

5,000.000,000 + 300,000,000 + 30,000,000 + 100

Who has

The standard form for sixty-seven thousand, four hundred and seventy-seven?

We have

67,477

Who has

100,000 less than 543,830?

We have

443.830

Who has

Three milliard, four hundred twenty-eight million, six hundred thousand, one? We have

3,428,600,001

Who has

A number with a digit worth 2,000,000,000?

We have

2,000,600,061

Who has

Five hundred twenty thousand, four hundred two

We have

520,402

Who has

Six milliard, nine million, two hundred thousand, ninety-nine

We have

6,900,200,099

Who has

The expanded form of 7,530,003,523?

We have

7,000,000,000 + 500,000,000 + 30,000,000 + 500 + 20 + 3

Who has

A number with a digit worth 1,000,000,000?







Unit 1, Lesson 6 Composing and Decomposing

We Have, Who Has? Cards

Answer Key: The game begins and ends with the card with the star.

1. We have 1,223,643,509 Who has Six milliard, two hundred twenty million, four hundred sixteen thousand, one?	9: We have 5,000,000,000 + 300,000,000 + 30,000,000 + 3,000,000 + 90,000 + 100 Who has the standard form for sixty-seven thousand, four hundred and seventy-seven?
2 We have 6.220.416,001 Who has a number with a digit worth 800,0007	10. We have 67.477 Who has 100,000 less than 543,830?
3 We have 78,812,934 Who has the word form of 584,453,238?	1.1 We have 443,830 Who has Three in liard, four hundred twenty-eight million, six hundred thousand, one?
4. We have Five hundred eighty-four million, four hundred fifty-three thousand, two hundred thirty-eight. Who has the expanded form of #04,000,040?	12. We have 3,428,600,001 Who has a number with a digit worth 2,000,000,000?
5. We have 400,000,000 + 4,000,000 + 40 Who has a number with a digit worth 10?	13. We have 2,000,600,061 Who has Five flundred twenty thousand, four hundred two
6. We have 6,230 904,010 Wito has 10,000 more than 7,323,134,000?	14. We have 520 402 Who has Six militard, ring million, two hundred thousand, ninety-nine
7. We have 7,323,144,000 Who has Four million, six hundred thousand, nine hundred ninety-nine?	15. We have 6,900,200,099 Who has the expanded form of 7,530,003 \$23?
8. We have 4,500.999 Who has the expanded form for 5,333,090,100?	16. We have 7,000,000,000 + 500,000,000 + 30,000,000 ÷ 500 + 20 + 3 Who has a number with a digit worth 1,000,000,000



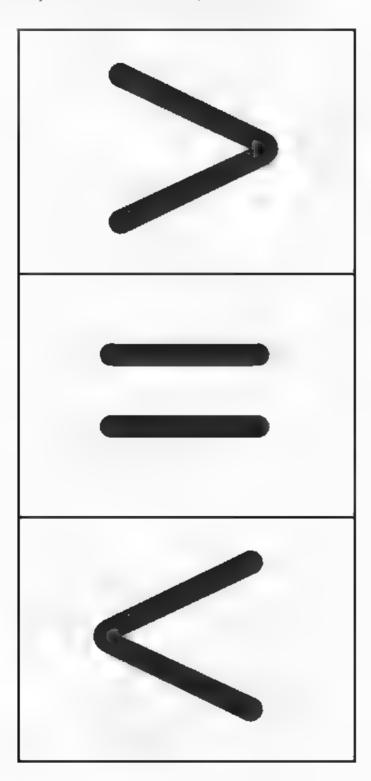




Unit 1, Lesson 7 Review Comparing Really Big Numbers

Comparison Symbols

Instructions: Photocopy and cut out one set for the teacher.









Unit 2, Lesson 1 Properties of Addition

Properties of Addition Anchor Chart

Instructions: Re-create a large version of this anchor chart to display in the classroom.

Properties of Addition

Additive Identify Property of Addition

- When you add zero to any number, the number stays the same.
 - Example: 26 + 0 = 26 or 0 + 26 26

Commutative Property of Addition

- No matter what order you add the numbers (addends), you get the same answer (sum).
 - Example: 9+4+1=14 and 1+4+9=14 and 4+9+1=14

Associative Property of Addition

- No matter how you group the numbers (addends), you get the same answer (sum).
 - Example: (7+3)+5=15 and 7+(3+5)=15 and (5+7)+3=15







Unit 2, Lesson 1 Properties of Addition

Mathematics Tool Kit

Instructions: Re-create a large version of this anchor chart to display in the classroom

Mathematics Tool Kit

 Replace large numbers in challenging problems with smaller numbers to understand the question.



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Unit 2, Lesson 2 Subtraction Strategies

Mental Math Strategies

Instructions: Photocopy or re-create a large version of this anchor chart to display in the classroom. Examples can be in a different color to make them easier to see. You will add more strategies to the anchor chart in upcoming lessons.

Front-End Estimation	Add or subtract only the largest place values in each number to produce an estimate (that may not be close to the actual answer). For example, in the problem 167 – 83, you can think 100 – 80 = 20.
Rounding	Select one place value for each number. Determine which multiple of 10, 100, 1,000 (and so on) it is closest to and then add or subtract for a more accurate estimate. For example, in the problem 167 – 83, you can think 170 – 80 = 90 (a far more accurate estimate).
Compensation	Regroup the numbers in a problem to create numbers that are easier to add or subtract mentally. For example, with 59 + 22, you can think "60 + 22 is 82 but I added one too many so the sum will be 1 less, or 81". Or for subtraction, with 17 - 9, you can think "17 - 10 is 7, but I subtracted 1 too many, so the difference is one more, of 8."
Break Up and Bridge	Break up the number being added or subtracted into numbers that are easier to add or subtract mentally, then go back and add or subtract the missing quantities. For example, with $92 - 26$, you can think " $92 - 20$ is 72 and then take 6 more away is 66 ," or for $537 \div 208$, you can think, " $500 \div 200 - 700$; $30 \div 0 - 30$; and $7 \div 8 - 15$. $700 \div 30 \div 15 = 745$."
Add to Subtract	Count up from the subtrahend to the minuend. For example, with $92 - 67$, you can think " $67 + 3 - 70$; $70 + 20 - 90$; $90 + 2 - 92$, $3 + 20 + 2 = 25$, $92 - 67 = 25$

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Unit 2, Lesson 2 Subtraction Strategies

Thinking Like a Mathematician

Instructions: Photocopy or re-create a large version of this anchor chart to display in the classroom.

Good Mathematici	Good Mathematicians					
Persevere	I can make sense of problems and keep trying.					
Represent	I can show what the problem is asking in pictures, numbers, and words.					
Explain	I can explain my thinking and work and compare my strategy with others.					
Model	I can apply what I know about math in different problems.					
Use Tools	I can choose appropriate tools and use them effectively to solve problems.					
Are Accurate	I work carefully and check my work to make sure it is accurate and precise.					
Use Structure	I can find patterns and use what I know to solve new problems.					
Notice Patterns	I can use what I notice to explain rules and shortcuts when solving problems.					



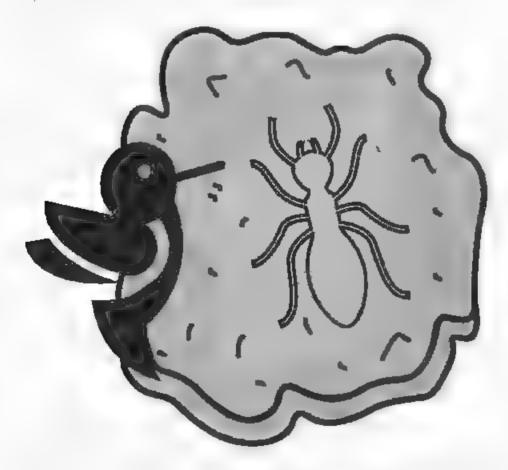




Unit 3, Lesson 7 Scaled Measurements

Largest Fossilized Ant: Titonomyrma luber

This ancient ant fossil was named trian for its size, *myrmo* for the Greek word for "ant," and *lubei* for the fossil collector who discovered the specimen, Louis Lube.



The largest ant species ever recorded was discovered in fossilized remains in Wyoming, USA. The insect, named *Titanomyrma lubei* for its incredible length, was about 5 cm long and comparable in size to a modern hummingbird. This image shows a hummingbird next to the fossi for reference. (A modern hummingbird is about 9 cm long.)





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Unit 4, Lesson 3 Something is Missing!

SCOOT Cards

Instructions: Photocopy and cut apart one card per pair of students.

The perimeter of the paper is 102 cm. What is the width? Width = 21 cm	2. The perimeter of the candy bar is 36 cm. What is the length? Length -	3. The perimeter of the cell phone is 472 mm. What is the width? Width -		
4. Find the missing length. X =	5. Find the missing width of the rectangle. X =	6. Find the missing dimension of the rectangle. X -		
X 24 m Permeter : 124 m	Fermelet 64 cm X	Perimeter 78 cm X		



Unit 4, Lesson 3 Something is Missing!

SCOOT Cards, continued

Instructions: Photocopy and cut apart one card per pair of students.

7. Find the missing 8. Find the missing 9. Self was building a dimension of the dimension of the rectangular garden rectangle box to enclose rectangle. 36 square meters of Х-X .z dirt. The length was 9 meters. How wide should the box be? Zm 12 m 9-⊓ х m me ûE ≈ serA Area 42 sq.m. Area - 120 sq.ms 10. Walaa had 60 cm of 11. If a rectangular fence 12. Formica ants build ribbon. She wants uses 126 meters ant mounds that to put it around a of wire, how many cover about 20 rectangular doll meters were along square meters. If blanket she made, each length? the mound was If she puts 10 cm on rectangular and had each side as shown, a width of 4 meters, how many cm will be what is the length? along the width? X 30 m **Warr** 10 cm Area 20 sq m

Answer Key:

- 1. 30 cm 2. 13 cm
- 4. 38 m
- **5.** 26 cm 6. 30 cm
- 3. 78 mm

- 7. 6 m 8, 10 m
- 9. 4 m
- 10, 20 cm
- 11. 33 m
- 12.5 m



Unit 4, Lesson 4 Odd Shapes

Shape Cards

Instructions: Photocopy and cut out one card for each student.

Shape 1	Shape 2
8 cm 2 cm	7 cm
Perimeter Area =	Perimeter 3
Shape 3 2 cm 5 cm	Shape 4 Sicm 2 cm
Perimeter Area -	Perimeter 3 Area -
Shape 5 Scale Ferimeter	Shape 6 Q cm 1 cm Perimeter =
Area -	Area -







Unit 5, Lesson 1 Understanding Multiplicative Comparison

Teacher Paper Strip

Instructions: Photocopy, cut apart, and tape together into one 90-cm strip. (Use the tabs to tape or glue the strips together without losing length. The tabs should not show on your finished strip.)

Tabs	for	tape	or	glue

•

Unit 5 Blackline Masters



Unit 5, Lesson 1 Understanding Multiplicative Comparison

Student Paper Strips (for ACCESS)

Instructions: Photocopy and cut apart.

				·	







Unit 5, Lesson 1 Understanding Multiplicative Comparison

Student Tapes (for BUILD)

Instructions: Photocopy; give one set to each student.

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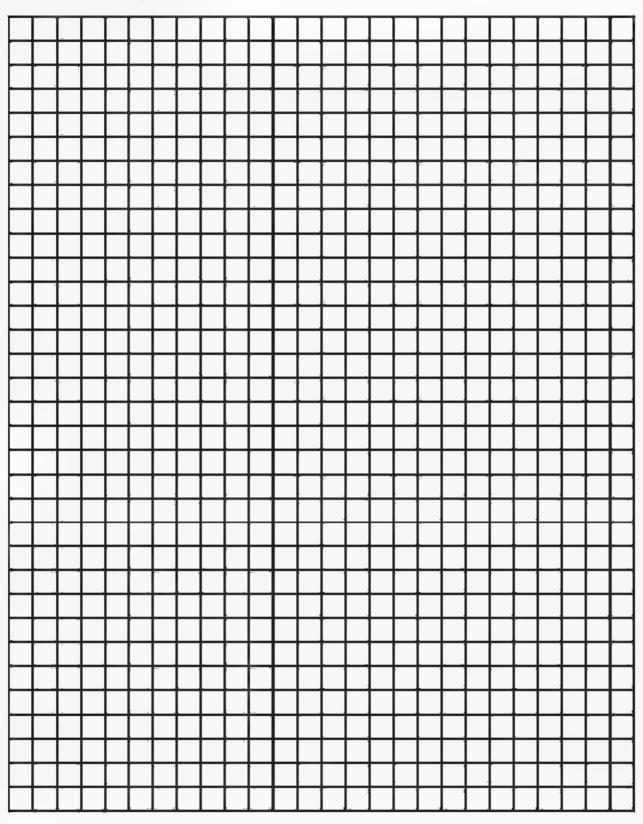
Unit 5 Blackline Masters

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Unit 5, Lesson 4 Commutative Property of Multiplication

Extra Graph Paper



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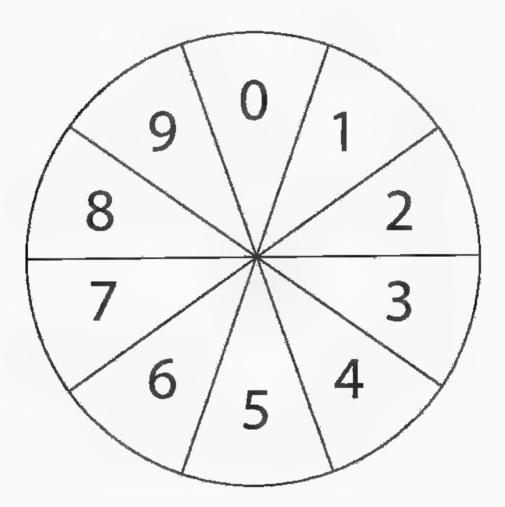




Unit 5, Lesson 6 Review Patterns in Multiplication

9 Spinner

Instructions: Photocopy one spinner per small group.



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Unit 6, Lesson 1 Identifying Factors of Whole Numbers

24 Tiles

Instructions: Photocopy one set per student and cut tiles out along the black solid lines

				:		
:				:		
				:.		
				:		
				:		



Unit 6, Lesson 1 Identifying Factors of Whole Numbers

Hundreds Chart

Instructions: Photocopy one Hundreds Chart per student.

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10



Unit 6, Lesson 3 Greatest Common Factor

Math Fluency Sprint

Score _____





Unit 6, Lesson 4 Identifying Multiples of Whole Numbers

Teacher Hundreds Chart

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Unit 6 Blackline Masters



Unit 6, Lesson 4 Identifying Multiples of Whole Numbers

Hundreds Charts for Multiples

Instructions: Photocopy one set of Hundreds Charts per student.

Multiples of 2

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	† 5	16	17	18	19	20
1	2,	3	4	5	6	7	8	9	10

Multiples of 4

81	വ							1	100
-	ØΖ	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20.
1	2	3	4	5	6	7	ස	9	10

Multiples of 3

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22.	23	24	25	26	27	28	29	30
111	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Multiples of 5

1	2	3	4	5	6	7	8	9	10
11	12	13							
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	29	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	(S)	100



Hundreds Charts for Multiples, continued

Instructions: Photocopy one set of Hundreds Charts per student.

Multiples of 6

91	92	93	92	95	ଘଣ	97	QQ.	99	don.
									-
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	7 7	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

Multiples of 8

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	9	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
111	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	G	10

Multiples of 7

9	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14		16		18	19	20
1	2	3	4	5	6	7	8	9	10

Multiples of 9

91	92	93	94	95	96	97	98	99	100
81	82	83	84	85	86	87	88	89	90
71	72	73	74	75	76	77	78	79	80
61	62	63	64	65	66	67	68	69	70
51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	29	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

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Unit 6, Lesson 5 Common Multiples

Multiples Match

Instructions: Photocopy one page per pair of students.

Partner A

A1.	A2. 3	A3.
A4. 9	2	A6.
A7. 4	A8.	A9 5

Partner B

B1.	4	2
B4. 3	6	B6. 9
B7. 5	₽8. 4	B9.







Unit 6, Lesson 6 Relationship Between Factors and Multiples

Factors and Multiples Game Cards

Instructions: Photocopy one set per pair of students.

10	30	20
15	12	9
24	8	50





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Unit 7, Lesson 5 **Review Connecting Strategies**

Matching the Models Cards

Instructions: Photocopy one set of A, B, and C cards for each student.

		Set A		
A1	² 17 × 4 68	AZ	¹ 62 × 5 310	
A3	1,523 × 4 6,092	A4	128 × 3 384	
A5	² 471 × 3 1,413	AS	535 * 2 1,070	
A7	2,761 × 2 5,522	AB	* 1 267 × 2 534	

B32



Unit 7, Lesson 5 **Review Connecting Strategies**

Matching the Models Cards, continued

Instructions: Photocopy one set of A, B, and C cards for each student.

Set B

17 4



Unit 7, Lesson 5 Review Connecting Strategies

Matching the Models Cards, continued

Instructions: Photocopy one set of A, B, and C cards for each student.

Set C

			2	iet C				
C1				C2				
	400	70	1		200	60	7	
\$9°0.	1,200	210	3	2	400	12.0	14	
C3				C4				
L, ii								
	100	20	8		2.000	700	60	1
3	300	50·	24	2	≉ ,000	1,400	120	2
C5				C6				
	500	30	5		.60)	2	
2	4,00D	60	10		30	0	10	
C7				CS				
	10		7		1,000	500	20	3
4	40		28	4	4,000	2,000	80	12
·		Ţ						

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Unit 7, Lesson 7 Area Models and 2-Digit Multiplication

Area Medel Cards

Instructions: Photocopy one set of cards per student. Have students out them apart

	<u>.</u>		1
20	10	2	7
30	9	4	10
2	70	10	15
20	10	2	7
30	9	4	10
2	70	10	15

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Unit 7 Blackline Masters

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Unit 7, Lesson 9 Putting It All Together

Story Problem Cards

Instructions: Photocopy one card per student and cut apart the cards.

1,	A satesperson has to drive 500 kilometers. For the first 3 hours, she drives
	65 kilometers per hour. For the next 2 hours, she drives 55 kilometers per hour
	How much does she have left to drive?

2. Seth drives for 2 hours and travels 500 kilometers. Maat drives for 3 hours and travels 430 kilometers. Adom also drives for 3 hours, but travels 55 fewer kilometers than Maat. How many kilometers do they drive in all?

3. On Earth Day, workers planted 65 seedlings an hour. They worked for 3 hours then took a break. After their break, they worked another 2 hours but only planted 55 seedlings per hour. How many seedlings did they plant in all?

4. There are about 27 car accidents per day in Egypt. The United States has about 62 times the number of car accidents per day. About how many accidents are there per week in the United States?







Unit 7, Lesson 9 Putting It All Together

Story Problem Cards, continued

Instructions: Photocopy and cut apart the cards.

5.	Yousself reads 27 pages every night for a week. Aya reads 62 pages every
	night for a week. How many pages do they read in all?

6. There are 500 tickets available for the show. They sold 65 tickets on Monday and 55 tickets on Tuesday. How many tickets are left for the show?

7. Analis planning a bicycle race. One lap of the track is 126 kilometers long. The racers must make 3 laps around the track and then ride another 12 kilometers to the finish line. How long is the race in total?

8. Yasmin bought 12 large sticker books. There were 96 stickers in each book. She gave 300 stickers away to her friends. How many stickers did she have left over?

Unit 7 Blackline Masters



Unit 7, Lesson 11 Patterns and Place Value in Division

Number Cards

Instructions: Photocopy one set per pair of students.

6	7	8
9	10	11
12	13	14
15	16	17
18	19	20
21	22	23
24	25	



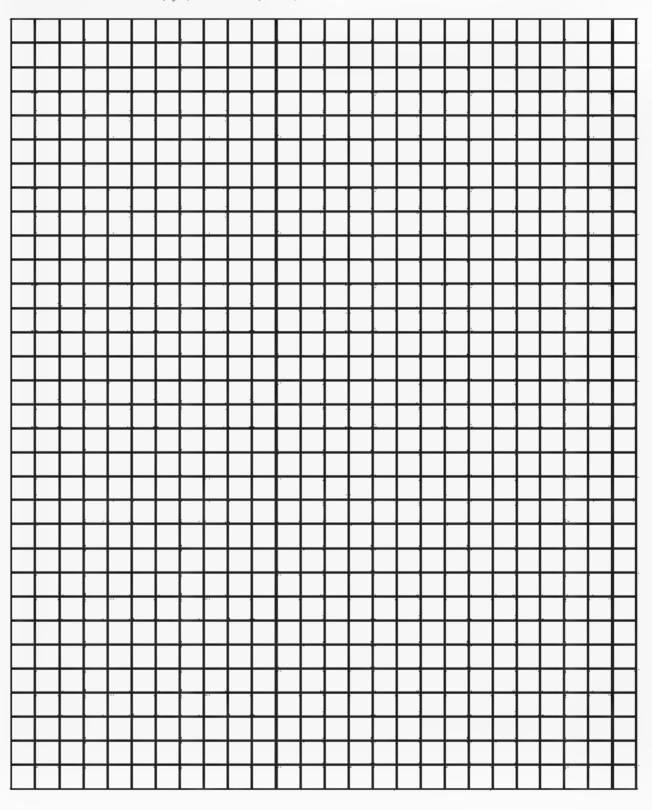




Unit 7, Lesson 11 Patterns and Place Value in Division

Graph Paper

Instructions: Photocopy one sheet per student.



Unit 7 Blackline Masters BIII



Unit 7, Lesson 12 The Area Model and Division

Target Number Cards

Instructions: Photocopy and cut apart one set for each small group of students.

2	2	2	2
2	5	5	5
5	5	5	10
10	10	10	10
20	20	20	30
30	40	40	50







Solving Challenging Story Problems

Show and Solve Story Problems

Instructions: Photocopy or recreate the cards and cut them apart. Place them around the classroom.

- Mira bought 4 packs of pencils. There were 28 pencils in each of those packs. She also had 3 smaller packs of pencils at her house. There were 12 pencils in each of those. Mira wanted to bring all her pencils to school and give them to 4 of her friends. How many pencils will each friend get?
- 2. Reem is stuffing envelopes. There are 1,500 envelopes. During the first hour, Reem stuffed 135 envelopes. During the second hour, she stuffs 141 envelopes. How many envelopes will Reem need to stuff in order to finish the job?
- 3. Jasmine wants to organize her books from greatest number of pages to least number of pages. Jasmine's longest book has 396 pages. Her shortest book has 276 fewer pages than that. If the book in the middle of her shelf has three times the number of pages of the shortest book, then how many pages does the middle book have?
- 4. Anmed serves ice cream at a local ice cream shop. He sells 19 ice cream cones on Saturday, 27 ice cream cones on Sunday, and 153 ice cream cones for the entire week. How many ice cream cones did Ahmed sell on the weekdays?
- 5. There are 1,421 tourists that visit the pyramids every weekend. How many tourists visit the pyramids in 8 weekends?

Unit 7 Blackline Masters



Unit 7, Lesson 16 Solving Challenging Story Problems

Show and Solve Story Problems, continued

Instructions: Photocopy or recreate the cards and cut them apart. Place them around the classroom.

- 6. A teacher bought 12 packs of crayons. Seven of the packs had 9 crayons in them. The other 5 had 10 crayons in each. How many crayons did the teacher buy in all?
- 7. Ali discovered a buried treasure box. She opened it up and found that it contained 682 diamonds and 117 rubies. She sold 45 diamonds and bought 130 emeralds. How many gems does she have now?
- 8. Four families went to the zoo. Each family has 2 adults and 2 children. Each child's ticket costs 14 LE and each adult's ticket costs 22 LE. How much will the zoo tickets cost in total?
- 9. Sarah received 352 LE for her birthday. She found some toys that cost 8 LE each. How many of the toys could she buy?
- 10. There are 164 people who play wind instruments and 20 people who play percussion in the band. If the band instructor puts 8 students in each row, how many rows will there be?





Unit 8, Lesson 1 Problem-Solving Strategies

Information Gap Number Cards

Instructions: Photocopy the cards and distribute one card per student.

8	24	3	×
12	_	6	11
21	2	+	10
20	_	7	3
+	13	5	×
4	•	16	18
9	# 	32	30

NUTE, Fig. (4 TT) Et (a) (a) (b) (c) (d)

2200-21 1137 AM









___A___

a.m.

A time between 12:00 midnight and 12:00 noon.

acute angle

An angle with a measure less than 90°.

acute triangle

A triangle with no angle measuring 90° or more.

add

To combine or join together; put together two or more quantities.

addend

Any number being added. In the equation 6 + 8 = 14, six and eight are both addends, 14 is the sum.

additive comparison

Problems that ask how much more (or less) one amount is than another.

Additive Identity Property of 0

When you add zero to a number, the sum is that same number.

algorithm

A step-by-step method for computing.

analyze

To study or examine something in detail.

angle

Two rays that share an endpoint.

angle measure

The measure of the size of an angle. It tells how far one side is turned from the other side. A one degree angle turns through 360 of a full circle.

arc

Part of a circle's curve between any two of its points.

area

The measure, in square units, of the inside of a plane figure.

area model

A model of multiplication that shows each place value product.

array

An arrangement of objects in equal rows.

Associative Property of Addition

Changing the grouping of three or more addends does not change the sum.

Associative Property of Multiplication

Changing the grouping of three or more factors does not change the product.

attribute

A characteristic or property of an object, such as color, shape, size, and so on.

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-B-

bar model

A model that uses bars to represent known and unknown quantities and the relationship between these quantities.

base

Any side of a plane figure. Usually thought of as a side where the figure "sits."

Base Ten numeral form

A common way of writing a number using digits. The value of a numeral depends on where it appears in the number (also known as standard form, such as 12,356).

Base Ten numerals

Any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9. The symbols can represent any amount based on a place value system of grouping by tens (also known as digits).

benchmark

A known size or amount that can be used as a reference to help understand a different size or amount. A benchmark can be used to estimate measurement.

benchmark fractions

Fractions that are commonly used for estimation. A benchmark fraction helps you compare two fractions. One-half, one-third, one-fourth, three-fourths, and two-thirds are all benchmark fractions.



capacity

The amount of liquid a container can hold.

centimeter (cm)

A metric unit of length equal to $0.01 \left(\frac{1}{100}\right)$ of a meter.

circle

A plane figure with all points the same distance from a fixed point called a center.

classify

To sort into categories or to arrange into groups by attributes.

clockwise

The same direction in which the hands on a clock move.

common

Belonging to or shared by.



common denominator

For two or more fractions, a common denominator is a common multiple of the denominators. Three-fourths and two-fourths have four as a common denominator.

common factor

Any common factor of two or more numbers. Six is a common factor of both 12 and 24.

common multiple

Any common multiple of two or more numbers. Six is a common multiple of both 2 and 3.

common numerator

For two or more fractions, a common numerator is a common multiple of the numerators.

Commutative Property of Addition

Changing the order of the addends does not change the sum.

Commutative Property of Multiplication

Changing the order of the factors does not change the product.

compare

To decide if one number is greater than, less than, or equal to.

compatible numbers

Numbers that are easy to compute mentally and are close in value to the actual numbers. Compatible numbers can be used when estimating.

compose

To put together smaller numbers to make larger numbers.

composite number

A number greater than 0 that has more than two different factors.

congruent

Having exactly the same size and shape.

counterclockwise

The opposite direction from the direction that the hands move on a clock.

cup (c)

A customary unit of capacity.

1 cup = about 236.5 millititers.

customary system

A system of measurement used in the United States. The system includes units for measuring length, capacity, and weight. Nearly everyone else uses the metric system.

data

A collection of information gathered for a purpose. Data may be in the form of either words or numbers.



Glossary

day

The length of time it takes the Earth to make a complete rotation, 24 hours = 1 day.

decimal

A number with one or more digits to the right of a decimal point. In 7.46, forty-six hundredths is the decimal or fraction of the whole.

decimal fraction

A fractional number with a denominator of 10 or a power of 10, it can be written with a decimal point.

decimal notation

Uses digits 0–9 and a decimal point. For example: 23.56 is in decimal notation.

decimal point

A dot (.) separating the whole number from the fraction (parts) in decimal notation.

decimeter (dm)

A metric unit of length 1 decimeter – 0.1 meter; 10 decimeters = 1 meter. A hand span is about 1 decimeter.

decompose

To separate a number into two or more parts.

degree (angle measure)

A unit for measuring angles. It is based on dividing one complete circle into 360 equal parts. A one degree angle = $\frac{1}{360}$ of a circle.

determine

To decide or settle upon, figure out.

denominator

The quantity below the line in a fraction, it tells how many equal parts are in the whole.

diagonal

A line that goes through vertices of a polygon that are not next to each other.

difference

The amount that remains after one quantity is subtracted from another. The answer in a subtraction problem.

display

To show, exhibit, or demonstrate.

digit

Any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9. (Also known as Base Ten numerals.)

Distributive Property

When one of the factors of a product is a sum, multiplying each addend before adding does not change the product.

divide

To separate into equal groups and find the number in each group or the number of groups.

56 split into 8 equal groups equals seven in each group, 56 ÷ 8 = 7

dividend

A number that is divided by another number.

56 is the dividend in the above example.

divisible

A number is divisible by another number if the quotient is a counting number without a remainder.

divisor

The number by which another number is divided, 8 is the divisor in $56 \div 8 = 7$.



elapsed time

The amount of time that has bassed (also known as time interval). Six hours elapse between 8:00 am and 2:00 pm.

endpoint

A point at either end of a line segment, or a point at one end of a ray.

equal

Having the same value, 2 feet = 24 inches

equation

A mathematical sentence with an equal sign. The amount on one side of the equal sign has the same value as the amount on the other side, 4 + 3 = 7

equivalent decimals

Decimals that have the same value, 0.7 = 0.70

equivalent fractions

Fractions that have the same value. $\frac{1}{2} = \frac{2}{4}$

estimate

To find a number close to an exact amount; an estimate tells about how much or about how many.

expanded form

A way to write numbers that shows the place value of each digit. 263 = 200 + 60 + 3

expression

A mathematical phrase without an equal sign. n + 4



fact family

A group of related facts that use the same numbers (also known as related facts), Fact family for 3, 5, 15; $3 \times 5 = 15$; $15 \div 5 = 3$; $5 \times 3 = 15$; $15 \div 3 = 5$

factors

The whole numbers that are multiplied to get a product. $6 \times 7 = 42$ (6 and 7 are factors.)



factor pairs

A set of two whole numbers that when multiplied will result in a given product. $2 \times 3 = 6$, $1 \times 6 = 6$. The factor pairs for 6 are: 2 and 3.1 and 6.

fluid ounce (fl oz)

A customary unit of capacity.

1 fluid cunce = about 30 milliliters.

foot (ft)

A customary unit of length.

1 foot = about 30 centimeters.

formula

A rule that is written as an equation, $A = I \times W$

fraction

A way to describe a part of a whole or a part of a group by using equal parts.

fraction greater than one

A fraction with the numerator greater than the denominator $\frac{5}{5}$

fraction less than one

A fraction with the numerator less than the denominator $\frac{5}{6}$

- G ---

gallon (gal)

A customary unit of capacity, 1 gallon = about 3.8 liters.

gram (g)

The standard unit of mass in the metric system. 1,000 grams = 1 kilogram. The mass of a paperclip is about 1 gram.

greater than >

Used to compare two numbers when the first number is larger than the second number.



half gallon

A customary unit of capacity.

1 half gallon = about 1.9 liters.

height

A perpendicular line segment from the base to the top of the figure.

hexagon

A polygon with six sides.

horizontal

Parallel to the horizon. Horizontal lines go from left to right or right to left.



hour (hr)

A unit of time, 1 hour = 60 minutes; 24 hours = 1 day.

Hundreds

The value of a digit that is the third position from the right when describing whole number place value.

hundredth

One of the equal parts when a whole is divided into 100 equal parts.

Hundredths

In the decimal numeration system, Hundredths is the name of the next place to the right of Tenths.

identify

Recognize or distinguish, figure out what it is, name it.

Identity Property of Multiplication

The property that states that the product of any number and 1 is that number: $n \times 1 = n$

inch (in)

A customary unit of length, 1 inch = about 2.5 centimeters.

intersecting lines

Lines that cross at a point.

inverse operations

Operations that undo each other. Multiplication and division are inverse operations. $8 \times 5 = 40$ and $40 \div 5 = 8$

interpret

To explain or tell the meaning of something.



justify

To show or prove to be right or reasonable.



kilogram (kg)

A metric unit of mass equal to 1,000 grams. 1 kilogram = about 2.2 pounds.

kilometer (km)

A metric unit of length equal to 1,000 meters.



length

How long something is. The distance from one point to another Length is measured in units such as centimeters, meters, and kilometers. One dimension of a 2-dimensional or 3-dimensional figure.

less than <

Used to compare two numbers when the first number is smaller than the second number.

like denominators

Denominators in two or more fractions that are the same.

like numerators

Numerators in two or more fractions that are the same.

line

A set of connected points continuing without end in both directions.

line of symmetry

A line that divides a figure into two congruent halves that are mirror images of each other.

line plot

A diagram showing frequency of data on a number line.

line segment

A part of a line with two endpoints.

line symmetric figures

Figures that can be folded in half and its two parts match exactly.

line symmetry

What a figure has if it can be folded in half and its two parts match exactly.

liter (L)

The basic unit of capacity in the metric system.

1 liter = 1,000 milliliters.

lowest terms

When a fraction is expressed with the fewest possible pieces, it is in lowest terms (also known as simplest form).

- M -

mass

The amount of matter in an object, usually measured by comparing with an object of known mass. White gravity influences weight, it does not affect mass.

mental math or mental calculation

Calculations that are done in a student's head without pencil and paper, calculators, or other aids.

meter (m)

A standard unit of length in the metric system.



metric system

A system of measurement based on tens. The basic unit of capacity is the liter. The basic unit of length is the meter. The basic unit of mass is the gram.

mile (mi)

A customary unit of length, 1 mile = about 1.6 kilometers.

milliliter (mL)

A metric unit of capacity, 1,000 milliliters = 1 liter.
This holds about 10 drops or 1 milliliter.

millimeter

A metric unit of length.

1,000 millimeters = 1 meter.

minute (min)

A unit used to measure a short amount of time.

There are 60 minutes in one hour.

mixed number

A number that has a whole number and a fraction.

model or visual model

A picture or representation of a solution, a number, or a concept.

month

A length of time equal to 28, 30, or 31 days. 12 months = 1 year.

multidigit

Having more than one digit (number). Seven (7) is a single digit, whereas seventy-two (72) or seven hundred forty-two (742) are a multidigit numbers.

multiple

A product of a given whole number and any other whole number, 12 is a multiple of 3 and 4 because $3 \times 4 = 12$.

multiplicative comparison

A way to compare quantities using multiplication, as in "This tree is 3 times shorter than that tree."

multiply

The operation of repeated addition of the same number, $3 \times 5 = 5 + 5 + 5$



number

The quantity we associate with a numeral.

Often used interchangeably with digit and numeral.

number line

A diagram that represents numbers as points on a line.

number names

A way of using words to write a number (also known as word form).



numeral

Represents the Idea of a number. The numeral 153 is composed of digits 1, 5, and 3. Often used interchangeably with digit and number.

numerator

The number written above the line in a fraction. It tells how many equal parts are described in the fraction.



obtuse angle

An angle with a measure greater than 90° but less than 180°.

obtuse triangle

A triangle that contains one angle with a measure greater than 90° (obtuse angle) and two acute angles.

Ones

The value of a digit that is farthest to the right when describing whole number place value.

order

MITE TE PH T1 SM Gibsaste 10

A sequence or arrangement of things.

Order of Operations

A set of rules that tells the order in which to compute.

- Do operations in parentheses.
- Multiply and divide in order from left to right.
- 3. Add and subtract in order from left to right.

ounce (oz)

A customary unit of weight equal to $\frac{4}{16}$ of a pound. 1 ounce = about 28 grams.



p.m.

The time between 12:00 noon and 12:00 midnight.

parallel lines

Lines that are always the same distance apart.

They do not intersect.

parallelogram

A quadrilateral with two pairs of parallel and congruent sides.

parentheses

Used in mathematics as grouping symbols for operations. When simplifying an expression, the operations within the parentheses are performed first.

partial product

A method of multiplying in which the value of each digit in a factor is multiplied separately, and then the partial products are added together.

partial quotient

A method of dividing in which multiples of the divisor are subtracted from the dividend, and then the partial quotients are added together.



A repeating or growing sequence or design.

An ordered set of numbers or shapes arranged according to a rule.

perimeter

The distance around the outside of a figure.

period

In a large number, periods are groups of 3 digits separated by commas or by spaces.

perpendicular lines

Two intersecting lines that form right angles.

pint (pt)

A customary unit of capacity.

1 pint – about 0.47 liters.

piace value

The value of the place of a digit in a number.

plane figure

A two-dimensional figure

point

The exact location in space, represented by a dot.

polygon

A closed two-dimensional shape with 3 or more sides.

pound

A customary unit of weight.

1 pound = about 0.45 kilograms.

prime number

A whole number greater than 1 that has exactly two different factors, 1 and itself.

product

The answer to a multiplication problem. In $6 \times 7 = 42$, 42 is the product/answer.

protractor

A tool used to measure and draw angles.



quadrilateral

A polygon with four sides.

quart (qt)

A customary unit of capacity. I quart = about 1 liter.

quotient

The answer to a division problem.



range

The difference between the highest and towest values.

ray

A part of a line that has one endpoint and goes on forever in one direction.

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Glossary

reasonableness

An answer that is based on good number sense.

rectangle

A quadrilateral with two pairs of congruent, parallel sides and four equal angles.

recognize

Identify (someone or something) from having encountered them before; know again, remember.

regroup

To rearrange numbers into groups of 10 when performing mathematical operations.

regular polygon

A polygon with all sides the same length and all angles the same measure.

related facts (fact family)

Related addition and subtraction facts or related multiplication and division facts. Related facts for 3, 5, 8: 3 + 5 = 8, 8 - 5 = 3; 5 + 3 = 8; 8 - 3 = 5 (also known as fact family).

remainder

The amount left over when one number is divided by another.

repeated subtraction

Subtracting equal groups to find the total amount of groups (also called division).

represent

To show or model.

rhombus

A quadrilateral with all four sides equal in length.

right angle

An angle that measures exactly 90°.

right triangle

A triangle that has one 90° angle.

round a whole number

To identify the hearest Ten, Hundred, Thousand, (and so on) and rename a number so it is easier to mentally add, subtract, multiply, or divide.

rule

Something that happens every time (for example: 2, 5, 8, 11... the rule is +3).

----- S -----

second (sec)

A unit used to measure a very short amount of time. There are 60 seconds in one minute.

sequence

A set of numbers arranged in a special order or pattern.



simplest form

When a fraction is expressed with the fewest possible pieces, it is in simplest form (also known as lowest terms).

simplify

To express a fraction in simplest form.

sketch

A quick, rough drawing.

specify

Identify clearly and definitely.

square

A parallelogram with four equal angles and four equal sides.

square unit

A unit, such as square centimeter, used to measure area.

standard form

A common or usual way of writing a number using digits, 12,376 is in standard form.

straight angle

An angle that measures exactly 180°.

subtract

An operation that gives the difference between two numbers. Subtraction can be used to compare two numbers, or to find out how much is left after some is taken away.

sum

The answer to an addition problem.



Tens

The value of a digit that is the second position from the right when describing whole number place value.

tenth

One of the equal parts when a whole is divided into 10 equal parts.

Tenths

In the decimal numeration, tenths is the name of the place to the right of the decimal point.

Thousands

The value of a digit that is the fourth position from the right when describing whole number place value.

time interval

A duration of a segment of time (also known as elapsed time).

ton

A customary unit of weight, 1 ton (T) = 2,000 pounds. A metric ton, or tonne (t) is a unit of mass equal to 1,000 kilograms (about 2,200 pounds).

Glossary | R1



trapezium

A quadr lateral with one pair of parallel sides and one pair of sides that are not parallel.

triangle

A polygon with three sides and three angles.

two-dimensional

Having length and width.

U

unit fraction

A fraction that has 1 as its numerator. A unit fraction names 1 equal part of a whole.

unlike denominators

Bottom numbers of a fraction that are not equal.

unlike numerators

Top numbers of a fraction that are not equal.



variable

A letter or symbol that represents a number. $5 \times b = 10$, b is a variable worth 2.

Venn diagram

A drawing with circles or rings to show how sets of objects are related.

vertex (plural: vertices)

The point at which two line segments, lines, or rays meet to form an angle.

vertical

Perpendicular to the horizon. Vertical lines go up and down.

volume

The number of cubic units it takes to fill a figure.



week

There are seven days in a week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday.

weight

The measure of how heavy something is.

whole

All of an object, a group of objects, shape, or quantity.

whole numbers

The numbers 0, 1, 2, 3, and so on, without fractions or decimals.

width

One dimension of a 2-dimensional or 3-dimensional figure.



word form

A way of using words to write a number. The word form of 12,345 is twelve thousand, three hundred forty-five.



yard (yd)

A customary unit of length, 1 yard = about 0.9 meters.

year

The length of time it takes the Earth to revolve around the sun, 12 months = 1 year; 365 days = 1 year; 366 days = 1 leap year.



Zero Property of Multiplication

The product of any number and zero is zero. 8 × 0 = 0

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